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UNITED STATES HYDROGRAPHIC OFFICE.

No. 84.

# THE WEST COAST

OF

# MEXICO AND CENTRAL AMERICA,

FROM THE

BOUNDARY LINE BETWEEN THE UNITED STATES AND MEXICO TO PANAMA,

INCLUDING

THE GULF OF CALIFORNIA.

WASHINGTON:
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# PREFACE.

Since publication No. 56 (Remarks of Commander George Dewey, U. S. N., on the coasts of Lower California and Mexico) was issued from this office, the whole coast described therein has been surveyed, with many additions and corrections to the preliminary charts. This has necessitated a new publication, revised and enlarged.

The present work has been compiled by Lieut. F. E. Sawyer, U. S. Navy, from notes and surveys of—

Commander Dewey and officers of U. S. S. Narragansett, 1873 to 1875.
Commander Philip and officers U. S. S. Tuscarora, 1878 to 1880.
Commander Philip and officers U. S. S. Ranger, 1881 to 1883.
Commander Clark and officers U. S. S. Ranger, 1883 to 1886.
Archives of the Hydrographic Office.
Office of Naval Intelligence. Bureau of Navigation.
Port Charges of the World. Hunter & Patten. Ed. 1884.
Commercial Relations and Consular Reports. State Department.
Remarks, &c., between San Francisco and Panama. Captain Parker.
Pacific Mail Steamship Company.
North Pacific Pilot. Imray, 1870.
The latest Hydrographic Office and British Admiralty charts.

J. R. BARTLETT,
*Commander, U. S. N., Hydrographer.*

U. S. HYDROGRAPHIC OFFICE,
*Washington, D. C., February* 1, 1887.

# NOTE.

The bearings, courses, and trend of the land are true. The direction of the winds is the point from which they blow; of currents the point toward which they set. Distances are expressed in nautical miles. Soundings, unless otherwise stated, are reduced to mean low water.

# CHAPTER I.

WEST COAST OF THE PENINSULA OF LOWER CALIFORNIA—GENERAL DESCRIPTION—WINDS, WEATHER, CURRENTS, ETC., FROM THE BOUNDARY LINE BETWEEN THE UNITED STATES AND MEXICO TO CAPE SAN LUCAS, INCLUDING CERROS, NATIVIDAD, AND SAN BENITO ISLANDS—ISLANDS AND SHOALS OFF THE WEST COAST OF LOWER CALIFORNIA.

The entire coast of the peninsula of Lower California, from the boundary line to cape San Lucas is, with the exception of the valleys of Santo Tomas and Todos Santos, barren in the extreme. The land is generally high and bold, but there are many places where vessels may anchor and find shelter from the prevailing coast wind.

The prevailing winds along the coast are from a northwesterly direction, and they may be said to blow steadily from that direction for eight months of the year. During the months of November, December, January, and February, winds from SE. to SW. will be frequently met with, and during these months moderate SE. gales, accompanied with considerable rain, will be occasionally encountered. Before the breaking of these gales the wind hauls to the SW. and sometimes blows quite hard for a few hours, then comes out from the NW. with fine weather. In December and January heavy northers are liable to occur; these winds blow from N. to NE. and last from one to three days. During the summer months strong SE. gales of short duration occur in the vicinity of cape San Lucas, sometimes extending as far north as Magdalena bay.

During the greater part of the year the weather along the coast is clear and pleasant, and the climate salubrious and mild; rains are most frequent between May and October. Fogs occur at all seasons of the year, the largest proportion, however, during the summer months; they usually occur at night or early in the morning and clear up about 10 o'clock in the forenoon, the remainder of the day being clear and pleasant. South of Cerros island there is much less fog than north of it, the weather clears earlier in the forenoon, the temperature is lower, and the winds lighter.

The currents along the coast set in the direction of the prevailing wind and vary in strength from half a knot to a knot an hour. Near the land the influence of the tides is felt. *At all times an easterly set should be guarded against.* A light NW. current has occasionally been found in the winter season, but it is rare.

**Boundary monument.**—The initial point of the boundary line between the United States and Mexico is marked by a white marble obelisk about 20 feet high, resting on a pedestal. It stands on a low table-land near the edge of a bluff, about 300 yards from the beach, and is visible from the water. Its position, as determined by the United States Coast Survey in 1871, is latitude 32° 31′ 58″.46 N., longitude 117° 07′ 32″.37 W., about $10\frac{2}{10}$ miles S. 36° 30′ W. from point Loma lighthouse.

**The Coronados islets** are a group of barren rocks of trap formation, of which the southernmost is the largest. On the west and northwest sides of the southern islet are two barren rocks which are a resort of the enormous sea-elephants that frequent this coast. From the northern end of the largest islet lies the northwesternmost of the group; between this islet and the others is a deep passage with numerous patches of kelp.

A fair anchorage can be found on the east side of the largest islet, a little south of its center, in 8 fathoms of water, sandy bottom. Boats may safely land in a small cove near the anchorage, which is open to the northward.

From the boundary to Descanso point the coast is clear, with the exception of a rock near the shore 4 miles above Descanso point and west of the ranch near the beach.

**Descanso Bay anchorage.**—An anchorage may be found anywhere along the shore of the bay in from 8 to 15 fathoms, sand bottom. To the southward of Sugar Loaf rock, which is the only danger, is an anchorage often used by small coasters.

**Ensenada anchorage** is in Todos Santos bay. The soundings have decreased slightly since 1873, caused by the streams in the wet season washing into the anchorage the light soil from the hill-sides. The point affords partial shelter from the NW. winds, execept in the winter, when a heavy swell sets in. Ensenada, the seat of government of the northern district of Lower California, is a port of entry. The population is 800. The place is improving rapidly in importance under the influence of the International Company of Mexico. Cattle raising is carried on to a considerable extent and some wheat is raised. The Californian and Mexican steamship line steamers stop at this port twice a month, also a line between San Diego and Ensenada. Vessels load and unload by means of lighters.

The United States is here represented by a consular agent.

**Todos Santos islands** lie N. 36° W. from Banda point. There is a clear channel between the southernmost island and Banda point.

**Anchorage** may be found in good weather on the northeastern side of the larger island in 10 fathoms, sandy bottom, the NW. extremity of the island bearing W.

**The Soledad rocks,** 1 mile west from point Santo Tomas, are small in extent and surrounded with kelp. There is deep water around them.

There is a channel between the rocks and point Santo Tomas with no *known* dangers. In passing through this channel take care to keep clear of the kelp on either side.

**Santo Tomas anchorage** is the shipping point for the village of Santo Tomas. No sign of fresh water could be found. The village of Santo Tomas is 11 miles from the anchorage. There are no buildings at present near the landing. Twenty-one miles below point Santo Tomas, behind the larger of two detached rocks, white from the deposit of birds so that they can be seen 5 or 6 miles, is a good landing place for boats. From here is a road to San Vincente. The mission is 7 miles inland. There is a rocky patch 1,200 yards off shore just above the mouth of the San Ysidro river. These are the only dangers from point Santo Tomas to Cape Colnett.

**Cape Colnett Bay anchorage.**—In the bight to the eastward of cape Colnett a good anchorage may be found abreast of a remarkable gorge in from 6 to 9 fathoms of water, sand bottom. The best landing place is at the intersection of the cliffs and the shingle beach at the bottom of the bay. Shoals make out a short distance to westward from cape Colnett.

**San Martin island** is quite barren, producing nothing but the prickly pear and a few stunted bushes growing among the lava. There is a good anchorage on the southeast side of the island, off a small lagoon which has communication with the sea at half tide. An anchorage may be found anywhere on the northeast side. Hassler cove is the best place to anchor, and is a snug little cove on the eastern side, protected on all sides except the north. Have an anchor ready for letting go after anchoring when the wind is from SW., as a sudden change to NW. might throw the ship on the reef. The island is surrounded by detached rocks and kelp and great numbers of seals and sea fowls resort here.

**Ben's rock** is very dangerous. The sea does not break in smooth weather, and it is not marked by kelp.

**San Quentin bay.**—The water is shoal for several miles along the shore and a long swell is usually found rolling in, making it an uncomfortable anchorage. The land in the vicinity is low and sandy; there is no vegetation except cactus and a few stunted bushes. No fresh water can be found near the coast.

**Rosario bay.**—A reef makes out to the southward of Punta Baja, and vessels entering this bay should give it a wide berth. A safe anchorage may be found in 5 to 6 fathoms, sand bottom, sheltered from the coast wind. The mission of Rosario is situated in a fertile valley a few miles inland.

**San Geronimo island** is a barren rock covered in many places with a mixture of sand and guano. There are many rocky patches around this island, and it is possible others besides those on the chart may exist.

**Caution.**—In the passage between this island and the mainland there are dense masses of kelp which should be avoided, and though there are no hidden dangers *known*, great care should be taken by vessels going through the passage.

**Sacramento reef** is very dangerous. There are several large rocks awash and above water over which the sea breaks constantly.

**Canoas Point anchorage.**—Canoas point is a sharp perpendicular sand bluff. An anchorage may be found under its lee, which is partially protected from the coast winds, in 5 to 7 fathoms, sandy bottom, about half a mile from the shore.

**Solitary rock** is about 20 miles to the southward and eastward from Canoas point, and half a mile from shore. It is surrounded by kelp; large quantities of drift weed were found on the beach in the vicinity of this rock.

**Blanco bay.**—The coast between Blanco point and Cone point recedes and forms this bay. A good anchorage may be found here protected from the prevailing coast wind. Just north of Cone point is a conspicuous hill of reddish color called Red cone. When this hill is first seen from the northward it has the appearance of an island.

**False bay.**—There is an anchorage in this bay in from 4 to 6 fathoms of water, quite well protected from the coast wind.

**Sebastian Viscaino bay.**—Within the limits of this great bay are several smaller ones. The eastern coast is for the most part low and sandy, with extensive marshes. The south coast has the same character till within a few miles of False point, when the bluffs become high and the mountains approach the coast. Whales were formerly abundant, and sharks are numerous where there is shoal water. Many varieties of fish are plentiful.

**Playa Maria bay.**—The shores of the bay are low, sandy, and barren. A few miles inland there is a little vegetation and some small game. The anchorage is uncomfortable on account of the swell which usually sets in.

**Elide island** is a barren rock covered with a thin layer of guano. It is a favorite resort of seals and sea fowl. A sand spit, over which the sea breaks, connects it with the mainland. Vessels sometimes anchor on the SE. side of the island, but the anchorage is not recommended, as a heavy swell usually sets in.

**Santa Rosalia bay** is a good anchorage in from 5 to 8 fathoms, sand bottom, sheltered from the coast winds. The best landing is on the north side of the bay on a shingle beach. The southern limit of the bay is marked by a dangerous reef, extending half a mile to the southward, and surrounded by kelp. There are numerous outlying rocks from the southern point of the bay. An ample supply of clams was found by the Narragansett's crew.

**Lagoon head** when first seen from seaward has the appearance of an island. To the eastward there is a small open bay, which affords a

good anchorage in from 3 to 8 fathoms water, sandy bottom. A good landing-place will be found on a sand beach at the foot of the bluffs, 2 miles east of the head.

**Manuela or Upper lagoon** has a narrow strip of sand beach interspersed with small hillocks and partially covered with stunted bushes between it and the bay. The entrance is obstructed by a bar, which makes off about a mile, and has 5 feet of water on it at low tide. The sea usually breaks on the bar in fine weather, except near high water.

**Black Warrior lagoon** southward of Manuela lagoon has shoal water off it from 1½ to 2 miles. Vessels have crossed the bar drawing 13 feet.

**Scammon's lagoon (Ojo Liebre)** is the most important of the lagoons that open into Sebastian Viscaino bay. It has never been surveyed. It is studded with low islets and there are numerous sand bars in it, many of which uncover at low tide. A branch known as Fort lagoon extends 8 miles to the southward of the main lagoon, and is navigable. Extensive shoals make off 5 miles from the entrance.

**Caution.**—No definite directions can be given for crossing the bar, which is constantly changing, and its passage should not be attempted by a stranger without either sending a boat ahead or buoying the channel. It is said that 18 feet have been carried over the bar (probably 12 to 15 feet would be found at ordinary high tides), which is about half a mile wide, the water rapidly deepening after it has passed to 4, 5, and 6 fathoms. The Narragansett was unable to examine either the channel or the lagoon, as the sea was breaking heavily over the bar during her stay.

The following is from a report by Capt. C. M. Scammon: "Scammon's lagoon was first known commercially in 1858. The passage into it is lined on the south side by a continuous line of breakers, forming a curve which extends 4 miles from the head of the harbor, reaching the bar, which has 3 fathoms of water over it at ordinary tides; detached breakers on the north side plainly mark that side of the channel, which is of sufficient width to afford a good beating passage for a vessel of 300 tons, drawing 12 feet. The brig Boston with the schooner Maria as tender, on a whaling and sealing voyage, were the first vessels to traverse this hitherto unknown whaling ground. At that time the waters were alive with whales, porpoises and other fish; turtles and seals basked on the shores of the low islands studding the lagoon, and many species of game were so abundant that acres of sand bars left bare by the tide were closely packed with geese, ducks, snipe, &c. A good channel is found along the south shore, reaching to near the head of the lagoon. To the north of this channel are numerous sand bars and low islets, the latter being the breeding place of seals and sea fowls."

**Salt.**—Near the head of the lagoon are the salt fields of Ojo Liebre, which are capable of furnishing an almost unlimited supply. Vessels of 400 tons may lie within 5 miles of where it may be put in lighters

of from 25 to 50 tons capacity. The surrounding country for miles from the shores of the lagoon is a sandy desert, the only vegetation consisting of dwarfed shrubbery and the ever-present cactus. The nearest fresh water is 7 miles distant, and everything for man's subsistence, except fish, turtle, and sea-fowl, must be brought from the interior or imported by sea. South and southwest from the lagoon may be seen the high, boulder-like peaks of the Santa Clara mountains.

**Chester islets** are two rocks covered with guano. The channel between them and the mainland off False point is filled with kelp. Although no *known* hidden dangers exist, it is not recommended to attempt this passage.

**Dewey's channel** between Natividad Island and San Eugenio point must be used with caution. On the Natividad side there is much foul ground, and the soundings are irregular. On the San Eugenio side there is a clear passage, kelp on either side plainly marking the channel.

**Cerros island** is of volcanic origin with numerous high peaks, which, in clear weather, can be seen for 60 miles.

To the northward of Morro Rodondo point is a small open bay. There is good anchorage in it from 7 to 10 fathoms, sandy bottom, not over a quarter of a mile from the beach. Care must be taken not to anchor too far off shore, as the water deepens suddenly.

About 4 miles N. of the anchorage is a good watering-place, which may be recognized by a patch of tall, rank grass that lies back of a sand beach 250 feet in length, the only one in the vicinity. The course of the stream ends in an arroya, about a mile to the southward of the easternmost point of the island and half a mile from the beach, where it is lost in the sand. There is a rough, wooden spout at the stream, by means of which casks can be filled. Other fresh-water springs are said to exist in some of the ravines to the northward, where landings can be effected.

**Western side Cerros island.**—There is generally a heavy surf on this side and there are extensive fields of kelp along the southwestern part.

In South bay an anchorage may be had in 7 fathoms water close to the shore and sheltered from the prevailing winds, but open to the southerly gales that sometimes occur in the early part of winter.

**Remarks.**—The northern part of the island is comparatively fertile. The crests and slopes of the mountains are covered with a growth of cedars and pines, some of which attain a height of 60 to 70 feet. A species of dwarf oak is also found, and the cactus and many varieties of shrubs and flowers grow in the ravines. The southern part is generally barren.

There are said to be a few deer on the island, while wild goats and rabbits are plentiful, especially in the northern part; sea-otters, seals, and sea-elephants resort to the shores in great numbers.

Report assigns great mineral wealth to this island, but only copper and a species of chromic iron were found, and these in small quantities.

Low fog banks in the morning are frequent, the peaks showing plainly above.

**The San Benito islands** are barren. There is an anchorage on the south side of the largest in 10 fathoms, sandy bottom.

A landing place may be found on a small shingle beach behind a large *red rock* that lies just to the eastward of SE. point.

There are boat passages between these islands.

**Pinnacle rocks** are very dangerous, with deep water around them.

**Port San Bartolome** is the best harbor on the west coast of Lower California between San Diego and Magdalena bay, and is free from hidden dangers. To the northward and westward of cape Tortolo there are numerous rocks, awash and above water, forming a natural breakwater, against which the sea breaks heavily.

Vessels may anchor anywhere in the bay after passing the point of the reef which makes out from cape Tortolo. The outer bay is somewhat exposed to the long regular swell from the ocean. The best anchorage is to the eastward of the reef, where smooth water will be found. The bay abounds in fish, turtle and sea-fowl; but no indications of fresh water were seen. This port used to be frequented by whalers for refitting.

**Thurlow Head anchorage.** East of Thurlow head is a small bay, where vessels may anchor in 6 to 7 fathoms and find protection. The land at the end of the bay is low, with a shingle beach.

**San Pablo bay** is open, and affords a good anchorage in from 10 to 15 fathoms about three-quarters of a mile from shore. It is apparently free from all dangers.

**Asuncion passage** is between Asuncion point and Asuncion island, through which from 4 to 6 fathoms may be carried. Use this passage only in an emergency and then keep well over toward the beach. The anchorage is on the eastern side of Asuncion island.

**San Hipolito bay.** An anchorage may be found in this bay in 5 to 6 fathoms, sandy bottom, under the lee of the point and half a mile from the shore.

**Abreojos Point anchorage.** A good anchorage may be found to the eastward of Abreojos point in about 6 fathoms. In making for the anchorage vessels are advised to give the 4-fathom reef to the southward of the point a wide berth. Abreojos point and the land in the vicinity are the favorite resort of the prong-horned antelope, large droves of which were seen, as well as the coyote or cajote, a species of wolf; both are very cunning and shy. At the foot of a barren hill on the SE. side is a pond, which contains brackish water not fit for drinking, but from the large numbers of animals seen, there is undoubtedly fresh water to be found at no great distance.

**San Ignacio lagoon.**—To the northeastward of Abreojos point is a large lagoon, which only vessels of small size can enter. Extensive shoals, which partly uncover at low tide, make off from this lagoon. The channel, in which will be found from 9 to 13 feet at low tide, is narrow and tortuous; it is clearly marked by the line of breakers on either side, which are the best marks for entering. Vessels drawing 12 feet may cross the bar at ordinary high tide. As soon as the bar is crossed the water deepens rapidly. At full and change of the moon the strong tide causes a heavy swell on the bar. At this particular place the land and sea breezes are strong and regular; were it not for this the passage would not be practicable for sailing vessels. Not far from the head of the lagoon is the village of San Ignacio, which numbers about 20 families.

**Products.**—Near the village are extensive tracts of cultivated land on which are raised grain, all sorts of vegetables, sugar-cane, dates, figs, olives, grapes, and many other fruits.

A never-failing supply of running water relieves the village from all danger of drought.

**Caution.**—The several passages into the lagoon are narrow and shallow. The lead is a good guide along this part of the coast; the land being low, its proximity is not easily distinguished, especially at night.

**Santo Domingo Point anchorage.**—The point is a remarkable perpendicular rocky cliff of dark color. An anchorage may be found to the eastward of the point, under its lee, in from 5 to 6 fathoms, half a mile from the shore. The surf breaks heavily on the rocks at the foot of the cliff, and unless the weather is moderate it is difficult and dangerous to effect a landing.

**Point San Juanica** is a sand bluff about 50 feet high, while half a mile to the eastward is a lagoon of the same name, which small coasters drawing 5 or 6 feet can enter. Considerable orchilla is gathered near the shores of this lagoon.

Vessels may anchor to the SE. of the point about a mile from the shore. Not far from the shore, on a barren hillside, is a spring, the waters of which are slightly sulphurous. On the rocks near the shores are numbers of abalones (an edible mollusk).

**The Boca de la Purissima** is open to the sea only during the rainy season. The valley through which the stream runs is narrow but fertile. The old village of Purissima has about 250 inhabitants and lies about 10 miles inland.

Only a small portion of the land near the village is cultivated; cotton, sugar-cane, wheat, vines, figs, oranges, peas, &c., are raised almost without labor. The *lomboi* (a small tree of soft, brittle fiber), from the sap of which an indelible ink is made, found nearly the whole length of the peninsula, flourishes luxuriantly here.

One of the principal occupations of the people is the manufacture of mescal, or pulque. It is a strong alcoholic liquor made from the sap of the maguey, a species of aloe.

**The Boca de Las Animas** is the northernmost of three entrances of a series of lagoons which extend the entire distance to Magdalena bay and connected with it. The lagoons lie nearly parallel to the coast and connect with each other. They are separated from the sea by a narrow strip of sand beach, and are used by the small coasting vessels.

There is good reason to believe that the shoals and bars at the entrances of these lagoons are subject to changes, necessitating a previous examination before attempting to enter. At high water and in moderate weather, the channels are plainly marked by the smooth water between the lines of breakers. At low water and in heavy weather the breakers extend farther outward, sometimes across the entrances.

The tide rises 5 feet, and in some places the current is quite strong.

On the plains fronted by the lagoons there are many wells, furnishing a permanent supply of good water. There is no reason why the whole plain should not be cultivated by artificial irrigation.

**Santa Maria Bay anchorage.**—Near the western shore of this bay, about a half a mile from the beach, good anchorage is found in from 5 to 8 fathoms, sandy bottom.

Abalones can be found in abundance along the shores, and fish abound.

**Magdalena bay**, which contains no hidden dangers, is the best and most spacious on the coast. In entering, especially with sailing vessels, keep over toward Entrada point, as the prevailing wind and current both tend to set the vessel toward cape Redondo.

To reach the best anchorage, at all seasons, follow the land to the northwestward from Entrada point at a distance of three-quarters of a mile to Man-of-war cove, steer for the light on a bearing N. 56° W., and anchor in 6 fathoms. In the winter months, with *southerly winds*, good anchorage will be found in the southern part. The chart is a sufficient guide if the lead is carefully attended.

The tides are regular and cause strong currents (from 1 to 2 knots) through the entrance.

In the summer the only regular supply of fresh water is obtained about 40 miles from the bay, near one of the northern lagoons, by small vessels which make regular trips for this purpose. Although there are several places marked on the chart as watering places, this is accounted for by the fact that water of an inferior quality has been obtained by sinking a cask in the sand near the beach. There is, however, said to be an excellent spring of fresh water near the southern end of Santa Margarita island.

Orchilla is found in great abundance and profitably shipped to San Francisco.

Fish, oysters, clams, mussels, and abalones are abundant in the bay and lagoons, and there is an abundance of game on the northern shores. Plenty of wood can be had.

In 1874 there were about ten h ouses in the settlement, one of which was the custom-house.

**Trail to La Paz.**—A rough trail through a barren and almost level country leads to La Paz, distance about 115 miles.

The United States is represented by a consular agent.

**Almejas or Lee bay** is merely a continuation of Magdalena bay and connected by a good channel. free from dangers.

**Rehusa channel** is too narrow and intricate for anything except boats. The current is strong, causing many tide-rips and overfalls.

**Point Del Marquis**, half way between Canejo and Lobos points, is low and rocky. It is the only rocky formation on this part of the coast and has a reef extending a short distance from it.

**Caution.**—Vessels may anchor anywhere in this vicinity in fine weather in 8 to 10 fathoms, a mile or two from the coast. In sailing along this part of the coast the lead should be used frequently, as the land is low and not easily seen, especially at night or in thick weather; the lead is the best means of finding its proximity.

**Todos Santos river** is a never-failing running stream, which flows through a fertile valley of the same name, reaching the sea about 1½ miles to the northward of Lobos point.

**Todos Santos.**—The village is situated on the bank of the river of the same name, 2 miles from its mouth. A road leads to it from a sand beach situated about half a mile above Lobos point, which is the best landing place in the vicinity. The village is on the site of the ancient mission of Santa Rosa, and is beautifully situated in a fertile valley, where all the advantages of a temperate and a tropical climate are combined, with few of the disadvantages of either.

**Products.**—It is surrounded by well-cultivated fields of sugar-cane, while in its gardens are found the cereals and vegetables of the north, together with the fruits of the south. Many thousands of pounds of sugar (panoche) are made every year; oranges, bananas, cocoanuts, dates, figs, pomegranates, limes, mangoes, guayatas, zapotes, &c., are raised, and the castor bean, indigo plant, and the pitahaya (a species of cactus with edible fruit) grow wild in the vicinity. The population is about 800.

This is an excellent place to procure fresh provisions and water.

In moderate weather a good anchorage may be found in from 7 to 10 fathoms, sandy bottom, one-third of a mile off shore and about half a mile to the northward of Lobos point. Anchor immediately after passing the range between Lobos point and the next point to the southward, San Pedro point.

**Lobos point** is the northwestern point of a high rocky promontory. It projects at a sharp angle from a sand beach which joins it to the northward, forming a little cove, slightly protected from the ocean swell. The best landing place is at the junction of the sand beach with the rocky point.

**Mount Agua** the most prominent peak, viewed from the westward, presents an almost perpendicular column. There is said to be a fresh-water lake near its summit, which gives an unfailing supply to the numerous herds of deer and other animals that are found in the vicinity.

**San Pedro point and bay.**—Just to the southward of the point is a small bay where landing is said to be practicable in good weather. Back of the sand beach, in a fertile valley, is the settlement of San Pedro.

**San Lucas bay.**—After passing Los Frailes steer for *Ritchie's*, a large white house, and the first object seen in making the anchorage. It affords a good anchorage and shelter from NW. winds; exposed to the sea from south to east renders it an *exceedingly unsafe anchorage during the summer or wet season*, when southeasterly gales are both frequent and heavy. Great care should be taken not to let go the anchor in deep water.

**The Village of San Lucas** consists of about a dozen houses, including a custom-house, and 150 inhabitants. It is situated on a level tract of land immediately back of a high ridge of sand mounds and knolls. The chief support of the people is raising cattle, for which the country is well adapted, and there are some extensive ranches in the vicinity. A road runs along the coast from here to San José del Cabo, a distance of 16 miles.

**Supplies.**—Wood, good beef and vegetables can be obtained at moderate prices, as well as an abundance of fresh water of fair quality. There is plenty of game in the vicinity.

The California and Mexican line of steamers call here each trip.

**Cortez shoal** lies about 46 miles S. 56° W. from Clemente island. The nature of the bottom is hard, composed of white sand, broken shells, and fine coral at the southeast portion, and sand with broken shells at the northeast. The shoalest and most dangerous part is that known as the Bishop rock.

Upon this bank the current is variable, frequently setting against the strong NW. winds with a velocity of nearly 2 miles per hour, producing at all times a heavy swell and even in moderate weather breaking heavily on the rocks. Proximity to the bank at night has been noticed by the increased swell.

This bank lies in the direct route now followed by the Panama and San Francisco steamers. Bishop rock is the only rock supposed to exist. As it is difficult to find single points below the surface in a seaway it will not be surprising if others are found. A prudent navigator will give this bank a wide berth. Its existence forcibly suggests that there is a possibility that other submarine ridges lie parallel to the coast.

**Guadeloupe island** is of volcanic origin and can be seen in clear weather a distance of 60 miles. The southern part of the island is barren, but in the northern part there are several fertile valleys.

Wood and water may be obtained from a small cove on the NE. side of the island, and goat's flesh may be obtained for the trouble of shooting.

There is a small cove on the SE. side of the island where vessels may anchor in 7 fathoms and find shelter from all winds except those from SE. to ENE., which seldom blow. Sailing vessels bound from San Francisco to the gulf of California generally sight the island, passing to the westward on account of the stronger NW. winds.

# CHAPTER II.

GULF OF CALIFORNIA—EAST COAST OF THE PENINSULA OF LOWER CALIFORNIA—GENERAL DESCRIPTION; WINDS; WEATHER; CURRENTS, &C.

The east coast of the peninsula of Lower California, bordering on the gulf, from cape San Lucas to the mouth of the Colorado river is, with few exceptions, high and precipitous, the mountains rising abruptly back of it.

Off the coast there are numerous islands, a description of which will be given hereafter, with navigable channels between them and the mainland.

The depth of water near the east or gulf coast of the peninsula is generally much greater than it is near the western or Pacific coast, but there are many places where vessels may anchor and find protection from the prevailing winds.

The coast and islands near it are generally barren, but there are some exceptions, among which are San Josef island, and the vicinity of Loreto and Mulege, on the gulf coast, and the vicinity of San Lucas bay and the valley of San José del Cabo, at the southern extremity of the peninsula.

The prevailing winds in the gulf of California, from November to May, are from the northwest; during the remainder of the year southeast winds prevail. In the upper portion of the gulf moderate northwest gales are frequently experienced during the months of December, January, and February. They generally last from two to three days. During the rainy season, or from May to November, southeasterly gales may be expected at any time in the lower part of the gulf.

Occasionally (usually with an interval of several years between them) a local hurricane or cyclone, known as El Cordonazo, blows with great violence; these occur at about the end of the rainy season and always blow from southeast to southwest. They are of short duration but tremendous force, and are accompanied by much lightning.

During the greater part of the year the weather along the coast is fair and pleasant, the heat of the day during the summer months being made tolerable by the succeeding cool nights. The scarcity of rain is compensated for, in some measure, by frequent heavy dews. During the winter months the northwest winds passing over the snow-covered peaks of the Calamahue mountains cause a quite low temperature in the northern part of the gulf.

Although the rainy season is said to be from May to November, but little rain falls during that period on the peninsula of Lower California and the land is for the most part dry and hot. Unlike the eastern or Mexican coast of the gulf in this respect, the rains, except in the southern part of the peninsula, occur mostly in the winter months. Summer rains are almost unknown north of Carmen island.

The following, taken from the work of M. Duflot de Mofras, attaché of the French legation at Mexico, and published in 1844, may prove valuable to the navigator:

"The year is divided into the dry and rainy seasons, the changes of which occur at variable periods. During the dry season the weather is always fine, the winds blowing regularly during the day from northwest to west, following the direction of the coast; they are replaced at night by a light breeze off the land or by calms.

"The rainy season, which commences in June, is at first indicated by calms and light showers of rain. As the season advances the showers become heavier, and, instead of ocurring only at night, they commence in the afternoon and terminate in very violent tempests, accompanied by thunder and lightning and violent winds from all points of the compass. This weather continues until the end of September, and it often happens that the season terminates with a violent hurricane, that usually occurs betweene th 1st and 5th of October, the feast days of St. Francis.

"These hurricanes, which always blow from SE. to SW., are of short duration, but are of such violence and raise such a tremendous sea that nothing can withstand them. They are known in the country as Los Cordonazos de San Francisco. A vessel surprised by them in a roadstead is liable to founder at her anchors, or, breaking from her moorings, be driven ashore. At the approach of the cordonazo the offing should be run for, or, if obliged to remain in the roadstead, an anchorage should be chosen where it will be easy to get under way at the first sign of the tempest's striking."

Although usually occurring about the 1st of October, these tempests have been experienced as late as the 1st of November, a fact which it is well to remember.

The currents in the middle of the gulf set to the southeastward; they are of very little strength and are greatly influenced by the tides. Along the western shore the current, when uninfluenced by the tide, sets to the northwestward, but it is so slight as to be hardly perceptible. Off Cape San Lucas the current sets to the eastward. The Narragansett experienced quite a strong easterly current off the southern extremity of the peninsula. The tides ebb and flow regularly along the coast, but their strength and direction depend greatly on the prevailing wind; the tidal current increases in strength toward the head of the gulf; at the mouth of the Colorado river they frequently run at a rate of 5 to 6 knots per hour.

**Fish.***—Nearly every species and variety of edible fish found in the waters of the Mediterranean, or on the coasts of Europe, the West Indies, Atlantic North America, or Chili, are found in the waters of Lower California in greater abundance than elsewhere. Their numbers are not only incredible, but many of them are of extraordinary beauty and brilliancy of color. The missionary and discovery writers bear invariable testimony to this feature of the animal life of California.

Swordfish of immense size are found in the waters of the gulf; they have been known to attack vessels and leave their swords in the timbers.

Sharks of several species abound in every bay and harbor; among them are the thresher and the hammer-head. Some of the sharks of the upper gulf waters are said to be as large as middling-sized California whales and to weigh over 1,000 pounds. They are called *tiburones* and reach a length of 30 feet; they are very ferocious and much dreaded by pearl-divers, boatmen, and fishermen.

A singular fish found in these waters is the *boops ochione*, or *bull's-eye;* it seems to be a species of sun-fish, and has only one large eye, about the size of a bullock's, set in the center of the upper part of the body.

**The Manta Raya**, a species of ray, is an immense brute of enormous strength, cunning, and ferocity, and is more the terror of the pearl-divers than any other creature of the sea.

One measured 17 feet in width, 11 feet in length, exclusive of tail (which was armed with a spine), and over 3 feet in thickness at the middle. Its mouth, armed with formidable jaws (no teeth) measured 26 inches across, occupying the space between two singularly-shaped flaps projecting from its head like horns. Its weight was estimated at 3,000 pounds. It seems identical with the horned ray, sometimes called sea-devil, of the Mediterranean.

Another inhabitant of these waters is the octopus (devil-fish), a gigantic mollusk, that is found in the rocky cavities along the shore, particularly in localities sheltered from the surf, where it lies quietly among the sea-weeds watching for its prey. Its arms, which are furnished with flat disks or suckers, are from 10 to 20 feet in length. With these arms it seizes, envelopes, and smothers its prey, which it afterwards devours at its leisure with its sharp, formidable bill.

**Red water.**—A very curious phenomenon of the gulf is the existence of extensive patches of red-colored water. This was noted by the earliest Spanish navigators, who at one time named the gulf "El Mar Verme Jo," the vermilion sea. It is believed that the first investigation and description of this phenomenon was by Assistant Surgeon Thomas H. Streets, U. S. N., of the U. S. S. Narragansett, in 1875. (See American Naturalist, February, 1878.) He makes a distinction between the vermilion patches of the mouth of the gulf and the brick-colored and corrosive waters of certain portions of the upper gulf. The

* J. Ross Browne.

former he assigns to the presence of countless numbers of ciliate *infusoria* suspended some distance *below the surface* of the water; the latter to the presence of great numbers of flagellate *infusoria*, the common *Noctiluca miliaris* floating *on the surface* of the water, giving it a milky red color.

**Cerro Colorado**, near Palmia point, and within half a mile of the beach, is composed of red sand-stone. It is an excellent landmark and is the only formation of the kind between cape San Lucas and San José bay.

**San José del Carbo bay.**—The heavy swell which sets into this bay at all times, and particularly during the season of SE. gales (May to October), makes it an uncomfortable anchorage and renders landing in ordinary ship's boats a hazardous undertaking.

**San José river** waters an extensive valley of the same name, which extends many miles into the interior, and empties into the sea a little over 3 miles from Palmia point. At ordinary times the water percolates through the high sand ridge thrown up by the action of the sea, and only breaks through at the time of freshets. A mile farther to the eastward is a small outlet, which is always open, where good water may be obtained at the last of the ebb. Mount San Lazaro kept on a bearing N. 45° 30′ W. leads up to the watering place.

**San José del Cabo.**—The village is on the western bank of the river, three-quarters of a mile from the sea. The population is variously estimated at from 1,000 to 1,500, of which a few are foreigners. Vessels may obtain a supply of fresh meat, vegetables, and wood at moderate prices.

The business of the place is mainly dependent on the silver mines of San Antonio. Some of the natives are engaged in the shark fishery and the preparation of shark oil; and it seems as though a profitable business might be done in the gathering and pressing of the castor bean, which grows wild in the vicinity in great abundance. There is also plenty of rosewood and cedar growing on the mountain sides

The United States is here represented by a consular agent.

**The Valley of San José** is the most fertile of Lower California. Throughout its extent are plantations of sugar-cane, cotton, corn, and tobacco, while in the gardens are groves of orange, fig, lemon, lime, and pomegranate trees, while plantains and bananas are found growing by the side of every ditch or aqueduct. Here and there are seen waving groves of palm trees.

**Road to La Paz and intermediate places.**—There is a road winding around the numerous lateral spurs of the Sierra de San Lazaro to Santa Anita, La Palma, Miraflores, Santiago, and Los Martires, near the coast in Palma bay; thence up a cañon to San Bartolo, San Antonio, Trifuno silver mines, and La Paz. Horses and mules for making this journey, which is somewhat over 100 miles, can be obtained at San José del Cabo.

**Salatea.**—An extensive salt marsh, known as Salatea, lies between the beach near the mouth of the river and the village of San José. By landing near the *watering place* it will be possible to procure horses to ride to the village and native guides who will point out the best places for fording the intervening water-courses. Generally there will be no delay in getting horses at this point, as the natives are on the watch for parties landing, and bring them down at once.

**High bluff.**—Just south of High bluff is a small settlement of people engaged in the pearl fishery. The sliver mines west of this place are not now worked.

**Arena point** is low and sandy, with a heavy serf breaking all around it; there are no outlying dangers, and the water off the point to the eastward is very deep, no bottom being found at 150 fathoms three-quarters of a mile off it.

Good anchorage may be found in moderate weather in from 7 to 10 fathoms water, dark sandy bottom, less than half a mile from the shore, Arena point bearing N. 24° E., distant 1 mile.

Near Arena point there is quite an extensive plain, covered with cactus and various kinds of bushes and trees; among the latter is the Copal tree, which is found in many places in the southern part of the peninsula. When approaching Arena point from the northward, do not approach it nearer than 1 mile; the lead should be kept going.

**Point Arena de la Ventana**, the eastern point of Ventana bay, is low and sandy; back of it, and to the westward, is a low sandy plain gradually rising as it extends inland.

**Caution.**—In rounding this point do not appreach it nearer than half a mile, as the soundings to the northward show only 6 fathoms, increasing rapidly from that point.

**Anchorage** may be obtained in moderate weather inside the point in from 6 to 8 fathoms, sandy bottom.

**Ventana bay** is much frequented at the proper season by vessels engaged in the pearl fishery. The southern shore of the bay is low and sandy, with an extensive plain back of it.

**La Ventana** is a small village, now in ruins, lying near the shore of the bay 9½ miles westward of point Arena de la Ventana. There is a road from the village to San Antonio (Trifuno silver mine), a distance of 15 miles; at one time the products of the mines were brought to La Ventana for shipment that are now taken to La Paz.

No supplies can be obtained here.

**Ceralbo island** is of volcanic origin, high and barren. It is said to contain rich copper mines. From the northernmost point, which is a high bluff, a reef of rocks extends nearly half a mile. Small vessels, especially those engaged in pearl fishery, frequently anchor to the eastward of and close under this point.

**Ceralbo channel** is clear and without dangers. A sailing vessel with a head wind, however, should not attempt to pass through it, as

the tide runs with considerable force, sometimes 2½ knots per hour. Calms are frequent.

**Caution.**—Unless well acquainted with the coast, it is not advisable to pass through in the night or in thick weather.

**Point La Luz.**—Fresh water may be obtained near the point.

**Scout Shoal buoy**, on the NW. edge of Scout shoal, in San Lorenzo channel, cannot be depended on.

**Remarks.**—Of the two passages, the northern one seems to be the safer for vessels drawing not over 21 feet, especially at night or in thick weather, as the shore, when followed at a reasonable distance, makes an excellent guide for avoiding the rocks and shoals.

The winds in the channel are regular the greater part of the year, blowing from a NW. direction from 9 a. m. until 4 p. m., and succeeded towards evening by a southerly wind, which lasts all night.

**Pichilinque Bay coal station.**—The Navy Department has a coaling station at this place. In January, 1886, there were about 1,400 tons of coal on hand; part of it had been exposed to the weather. There is a good tool-house here. The watchman has a dwelling near the coal-shed.

On the western side of the island is a salt lagoon, sandy bottom. It is dry nearly all the year, and is a good drill-ground for 300 or 400 men.

**Lighters** may be hired at La Paz at from $10 to $15 per day. The ship using them has to bring them from La Paz, also return them. If men are desired to coal ship they can be obtained at La Paz at a cost of $1 per day. They coal ship at the rate of 8 tons per hour.

It is necessary to take a pilot for La Paz. They are reliable and charge $25.

**La Paz**, with a population of about 4,900, is the largest and most important town of Lower California, as well as the seat of government. There is a small police force and a regular garrison of 60 to 100 men. The principal part of the town is built on low, flat ground, but many of the fine residences, the cathedral, and the cuartel are situated on a low table-land back of the town.

**The climate** is healthy, though the place has been visited by yellow fever. The thermometer ranges from 69° in the morning to 96° after noon. From August to October—the rainy months—is considered the sickly season.

**Quarantine** when established is strict and enforced by a sanitary commission appointed by the governor. Vessels are boarded by the captain of the port before any communication can be had with the town. A hospital is temporarily established during any epidemic and a surgeon is employed by the government.

**Fresh provisions** of a medium character and in small quantities may be obtained; beef costs 9 cents per pound, vegetables and fish are reasonable; potatoes, however, are brought from California and are expensive.

**Water** may be obtained at a moderate price, although the supply is somewhat limited. It is pumped from wells on the higher ground back of the town and carried by pipes to the end of the wharf, where casks can be filled.

**Commerce.**—The imports are principally from the United States. The exports are silver ores, bullion, hides, orchilla, and pearls. A new and high tariff went into effect on July 1, 1885.

**Communication.**—All mail goes via Guaymas; there is a telephone line to the silver mines. Two regular lines of steamers call here; the California and Mexican Steamship line connects with San Francisco, Mazatlan, Guaymas, San Lucas, Magdalena bay, and Sausauleto once a month, and the Sonora Railway Steamship line with Guaymas, Mazatlan, San Blas, and Manzanillo every two weeks.

The United States is represented by a consul and vice-consul.

**Mechudo head,** an excellent landmark, is the only prominent peak in the range of table mountains and is visible upwards of 50 miles. There is said to be plenty of game in the mountain country in this vicinity, such as hares, rabbits, deer, foxes, squirrels, antelopes, wild-cats, lions (chimbicá), &c.

**Espiritu Santo island,** said to contain copper mines of great value, is of volcanic origin.

**Lupona point.**—In the bight to the southward of this point is an anchorage in from 5 to 6 fathoms protected from the NW. winds.

**Gallo and Gallina anchorages.**—Between these islands and Espiritu Santo is a partially protected anchorage, frequently used by the coasting vessels.

**La Paz Bay winds.**—From May to November NW. winds prevail during the day, succeeded during the night by light by light airs from the southeastward. During the remainder of the year winds from SE. to SW. prevail day and night.

**San Josef channel** is much used by sailing vessels when beating up the gulf; thus is avoided the heavy sea outside and advantage taken of the strong tides which set through the channel. In case of bad weather an anchorage and shelter may be found in the numerous bights and coves on both sides. In using this channel at night or in thick weather, keep well over on the western shore, as there are no outlying dangers on that side. The current sets strongly through the channel, varying from 1 to 3 knots.

Two miles to the southward of San Evaristo point is a low sandy point, immediately south of which is a good anchorage in 5 or 6 fathoms, half a mile from the beach; another is found immediately south of San Evaristo point, in a cove which has a sandy beach at its head.

**Nopolo point.**—One and a quarter miles south of this point is a slight indentation, where it is said fresh water may be found.

**San Francisco Island anchorage.**—An anchorage may be found in from 5 to 10 fathoms off a sand beach that lies just west of the southeastern head of this island.

There is a channel between San Josef and San Francisco, but a group of rocks in the center, and Seal rock, make it dangerous and its passage should not be attempted unless in an emergency; if obliged to use it, it is safest to keep San Josef close aboard.

**San Josef island**, though of volcanic origin, is covered in most parts with vegetation, especially on the high land, and while no detailed examination has yet been made of the interior, it is in general a succession of high bluffs with intervening sand beaches. Large numbers of deer are found on it, which are hunted only for their skins.

**Amortajada Bay anchorage.**—In the southern part of the bay is a good anchorage in 7 or 8 fathoms, protected from every wind, especially from the dreaded *cordonazos* or southeasterly gales. Fresh water may be obtained here.

**Salinas Point anchorage.**—Southward of the point is a good anchorage in 5 to 10 fathoms, 200 or 300 yards from the shore. Just north of the point is a lagoon with a shallow opening.

There is apparently a clear passage between San Josef and San Diego islands, but it should be used with caution as it has not been thoroughly examined.

**San Marte bay.**—Vessels may find a good anchorage in fair weather in from 10 to 12 fathoms, within a third of a mile of a small sand beach at the bottom of the bay; the land back of the bay is mountainous.

**Agua Verde bay.**—A good anchorage may be had in this bay. Fresh water may be obtained from a ranch near the beach. The best landing place is in the eastern part of the bay.

**Monserrat island**, like others in this vicinity, is of volcanic origin and perfectly barren.

**Santa Catalina island.**—No detailed examination has yet been made, though it is reported that there is a landing place at the southern end of the sand beach.

**Caution.**—The channel between Candeleras point and Danzante island should be used with caution, as there may be other rocks beside those shown on the chart.

About 2½ miles southward of Coyote point is a sand beach, where an abundance of fresh water may be found from wells 10 to 15 feet deep.

**Puerto Escondido**, or hidden port, is a perfectly safe and landlocked harbor for small vessels. The entrance is only 75 feet wide, with only 9 feet on the bar at high water.

**Danzante island** is barren. On the SW. side is a strip of sand beach off which an anchorage may be found. The channel between Danzante and Carmen islands is clear and is much used by vessels coming from the southward bound to Loreto. The tidal currents through this channel are very strong.

**Loreto.**—The mission was founded in in 1697, and the town was the ancient capital of the two Californias. It is situated at the entrance to a valley which extends inland to the high mountains of the Sierra de

la Giganta. At the time of the Narragansett's visit it was a straggling village of adobe houses, mostly thatched with palm leaves, and containing about 150 inhabitants. The site was badly chosen, being on the bank of a water-course, often dry for several years in succession, but which, after heavy rains in the mountains, is apt to become in two or three hours a raging torrent, sweeping everything before it. From time to time portions of the town have been destroyed or carried off by this stream, so that nearly all that now remains of the old town is the mission church and its adjoining buildings. The church, a large stone structure with an arched roof and a dome at one end, is in pretty good repair. It contains some paintings and other ornaments worthy of notice; the altar and baptismal font are of pure alabaster.

There is a good anchorage in ordinary weather off the town in 8 or 9 fathoms, half a mile from the beach; the best place to anchor is with the church and Sugar-loaf peak in line. Immediately south of the mouth of the water-course before mentioned, a sand spit with but 2 fathoms of water over it makes off nearly a quarter of a mile from the shore.

**Supplies.**—Fresh beef, wood, water, vegetables, and fruit may be obtained at Loreto. Near the town, to the northward, are several small lagoons, which are a favorite resort of wild ducks at certain seasons of the year.

**Remarks.**—There is no fruit or vegetable, either tropical or of the temperate zone, that cannot be cultivated here; cabbages, cotton, lettuce, tobacco, wheat, corn, and onions were all seen growing together in the gardens, while the olive, date-palm, orange, lemon, and banana are met with in abundance, and the vineyards produce a wine unequaled by any of those of Upper California. The *palma-christi*, or castor bean, is here a large tree with a woody trunk. Of the woods useful in the arts, the *uña de gato*, or cat's claw, is found here and at Mulege. It is a leguminous tree, the branches of which bristle with curved thorns resembling cat's claws; the wood is very firm and durable, taking as fine a polish as rosewood, and surpassing the latter in beauty.

Loreto, formerly the center of a considerable pearl trade, is the seaport of Comondu, with which it is connected by means of a road which passes over the Sierra de la Giganta; there is also a road to Mulege, about 70 miles up the coast.

**Sierra de la Giganta**, the highest peak of which is La Giganta, lies back of this part of the coast. The road from Loreto to Comondu passes over the mountain range, winding by zigzags up to what appear from below to be inaccessible cliffs whence a slightly descending plain extends to Comondu. A copper mine at the foot of the mountains, known as El Sance, is said to be very rich, but it is not worked at present.

**Comondu** is an ancient mission and contains the ruins of a church that was doubtless a superior building. Many of the houses in the village are of cut stone; the remainder, of bamboo, are covered with

palm thatch. The population is variously estimated at from 500 to 1,000. The valley in which Comondu is situated is about 6 miles long and rarely more than a quarter of a mile wide. It is very fertile, and most of it in a high state of cultivation, the principal products being panoche (the native sugar), wine, and fruits. A fine perennial stream of water flows through the valley, affording an abundant supply to the village.

At the head of the valley is a cañon cut in solid lava, 100 feet deep, with almost perpendicular sides.

**Salt pond and village, Carmen island.**—Near the head of Salinas bay, separated from the sea by a strip of shingle beach a little over a quarter of a mile wide and over which the sea never flows, is a salt pond or lake, about 1½ miles long and a mile wide, the water in which rises and falls with the tide, although there is no perceptible communication with the sea. The supply of salt (which is perfectly pure) from this pond seems inexhaustible, as what is taken away in one week is reproduced in the next. The salt is precipitated in the form of pure crystals and has only to be raked from the bottom, packed and shipped to San Francisco, where it is ground and sold without any purification as the finest table salt. The pond is connected with a landing place in Salinas bay by a railway. There is a small village situated on the shingle beach that intervenes between the salt pond and the head of the bay.

At the top of a high cliff near Perico point there is a natural cave which is resorted to by the inhabitants of the village during the summer months to escape the heat, mosquitoes, and gnats.

**Fish and turtle** abound in the bay, and beds of the long-shelled oysters are also found.

**The coast** north of Loreto is low and sandy for a distance of about 4 miles, affording good anchorage anywhere within half a mile of the beach in from 3 to 7 fathoms of water.

**Passage.**—Nearly in the center of the passage between Coronados and the mainland is a low islet surrounded by shoals, making a passage 800 yards in width, with a least depth of 3½ fathoms; to pass through, it is only necessary to keep in mid-channel. Between the islet and the SW. point of Coronados island there is a passage a quarter of a mile wide, with 4 and 5 fathoms, rocky bottom, These passages are not recommended for vessels of any considerable size.

**Anchorages.**—To the northward of the low sand spit which makes off from the southwest side of Coronados island is an excellent anchorage in which to ride out a southeaster. To the southward of Mangles point there is also a good anchorage with protection from northwesterly winds, in from 5 to 9 fathoms of water, a scant half mile from the shore.

In making for the anchorages care must be taken to avoid some rocks, the highest of which is only 2 feet above high water, that lie 2¼ miles S. 16° E. from the point, and about a mile from the nearest land to the westward. Coming from the northward and intending to

anchor, vessels may haul close around the point, as there is plenty of water and no hidden dangers.

Mangles anchorage is well known on the coast for the superior quality of wood that grows in the valleys near by; it is said that fresh water also can be obtained here.

**San Juanico cove.**—South of San Basilio point there is a small open bay, on the shores of which are some yellow bluffs and sand beaches; behind one of the latter is a fine valley, where, it is said, fresh water may be procured. In the northern and western parts of the bay are a number of detached rocks, both above and below water.

Patches of red water are frequently met with off this part of the coast.

**Concepcion bay.**—There are several small islands in the western part of this bay and a number of anchorages where vessels may lie in safety. It is one of the best anchorages in this vicinity.

**La Tinaja point** is famous for a well which supplies the best fresh water found near the shores of the bay. The well is situated just above the high-water mark, and is 2½ feet deep by 20 inches in diameter; the sides are of clay and gravel, and the bottom of rock. The water in the well rises and falls with the tide, but is quite fresh. The road to Mulege and Loreto passes close by the well, which is a favorite halting place for travelers.

**Mulege anchorage** is between Sombrerito and Prieta points. In standing in for the anchorage, as soon as Colorado peak is made out, steer for it, being careful not to get it on a bearing S. of N. 84° 22′ W., as there is much foul ground near the coast south of that line of bearing; anchor in from 5 to 7 fathoms, half a mile from the beach.

**Mulege** was formerly the mission of Santa Rosalia de Moleje, and is situated on the bank of a fresh-water stream (Rio Santa Rosalia), a little over 2 miles from its mouth. It is a small, straggling village, the inhabitants of which, variously estimated from 500 to 1,000 in number, are engaged principally in mining, pearl-fishing, raising and exporting fruits. They are much more enterprising than the majority of the inhabitants of the peninsula.

**Supplies.**—Wood, water, and excellent fresh beef may be procured at all times, as well as many varieties of vegetables and fruit in their season. Game is abundant in the mountains back of the village, and the wines of Mulege, resembling heavy port and claret, are famous.

There is good anchorage off the south end of San Marcos island, eastward of the low sand-spit, in from 5 to 7 fathoms of water.

**Fresh water** may be obtained near the northern end of the island and an abundance of goat's flesh for the trouble of shooting.

**Remarks.**—Extensive deposits of gypsum, generally in its crystallized form of selenite or alabaster, are found in this vicinity in exposed layers 25 to 50 feet thick, and might be easily and profitably worked. The mining districts are said to contain gold and silver; pumice stone

is found in several localities, and one of the hills is said to be composed entirely of talc. Pearl-fishing was formerly carried on to great advantage, owing to the many beds of pearl oysters that existed in the neighborhood, a few only of which remain.

**Six Cañons.**—Cañon de Santa Agueda is the southernmost of six similar valleys or cañons between Santa Agueda point and Santa Maria cove. They are widely known for their yield of rich copper ore, which comes from some distance in the interior. The mines were being worked at the time of the Narragansett's visit, and during that year 18 ships were loaded with the ore, principally for European markets. The ore is mostly from the surface and in the form of malachite.

At cañon de Providencia and cañon de Purgatorio are landing piers, and a short distance to the northward of cañon de Santa Rosalia is a ranch close to the beach.

**Caution.**—In anchoring off these cañons the lead must be kept constantly going, as the water is deep to within a quarter of a mile of the shore and then shoals suddenly.

**Punta Baja** is of shingle, with a shoal extending off a short distance. Just south of the point is the mouth of a cañon which leads up to a silver mine, known as *Reforma.*

**Santa Anna bay and anchorage.**—The southern and western shores of this bay consist of sand and shingle beaches, the low land back of them sloping gradually from the mountains. Anchorage may be had with shelter from southeasters. On the point is the opening of a small lagoon into which Santa Anna creek flows. This *fresh-water* creek may be recognized by the grass and trees on its banks.

**Cape San Miguel.**—An anchorage may be found just south of this cape, sheltered from NW. winds, in 7 or 8 fathoms, half a mile from shore.

**San Francisquito bay** affords good shelter from the NW. or SE. winds, which are the prevailing ones in the gulf. The country in this vicinity is very barren and stony.

**Sal-si-puedes channel** is wide and deep, through which sets a strong current; this is especially so with an ebb-tide and a northwesterly wind, against which sailing vessels find it almost impossible to make headway.

Owing to the great depth of water in most parts of the channel there are few places where a vessel can anchor, except near the western shore and in the vicinity of the Raza and Partida islands.

**San Lorenzo islands** are of volcanic origin. Three miles to the SE. of the boat passage is a landing in smooth weather, and at the SE. extremity of the island is another small sand beach, which with a NW. wind affords a landing. With these exceptions the shores are bold, rocky bluffs predominating.

The passage between San Lorenzo islands and Sal-si-puedes island is not recommended, as it has not been thoroughly examined.

**Isla Raza anchorage.**—An anchorage can be found on the south side of this island, about 600 yards from shore. There is a landing pier and a house and flag-staff on shore abreast of the anchorage.

**Remarks.**—The tidal currents in the vicinity of these islands are very strong, occasionally causing heavy tide-rips. Northwesterly winds frequently blow with great violence for 2 or 3 days at a time.

**Raza island** is widely known for its valuable deposit of guano, which is not, as in some other places, composed of the excrement of birds, but of igneous rock, which has undergone a chemical change by the action of the ammonia and phosphates contained in their excrement. The surface guano is collected in the form of dust and shipped in bags; the layer succeeding is composed of "clinkers," which require crushing before using. These "clinkers" are richer in the phosphates than the pulverized guano and are more easily gathered and shipped. The birds that frequented the island at the time of the Narragansett's visit were principally gulls, and were present in such numbers as to literally cover the ground.

The island has been worked by a company for several years past and over 10,000 tons of guano were shipped, principally to European ports, in the first two years.

**Isla Partida.**—On the western side is a small cove or bight, open to the northward, in which there are from 3 to 8 fathoms of water. A rock 85 feet high lies off the steep bluff point which forms the western side of the bight. Off the eastern side, about a third of a mile distant from it, is a small islet 75 feet high.

Between this islet and Isla Partida anchorage can be found in from 5 to 20 fathoms, with shelter from the northwesterly winds.

**Ballenas channel.**—Sometimes the northwesterly winds blow through this channel with great force, raising a heavy sea, against which a vessel can make but little headway. The tidal currents are at times very strong; a current of 3 knots was experienced by the Narragansett.

Soundings obtained within less than a mile from the shore of Angel de la Guardia gave 205 fathoms and the water throughout the channel is believed to be very deep.

**Las Animas bay.**—An anchorage can be had here protected from the prevailing winds. The best anchorage is in the southern part in from 6 to 12 fathoms, near the lagoon entrance. Take care not to approach the latter nearer than three-quarters of a mile.

**Angeles bay** is a fine sheet of water, which covers an area of about 25 miles. It is almost completely landlocked, having for its protection on the E. and NE. no less than fifteen islands and islets. The shores of the bay are for the most part sand beaches, with one or two rocky bluffs. In the southern part, shoal water extends off some distance from the shore.

There are several safe passages into the bay. The southernmost is between Red Point (which is a reddish colored, rocky bluff) and two

small islands, 50 and 70 feet high, which lie about 600 yards to the northward of it. This channel is believed to be entirely free from hidden dangers and has a depth of water varying from 20 to 30 fathoms. Another passage, which is considered perfectly safe, lies to the northward of the two islands just mentioned, between them and a larger island of a dark reddish color, on the southern face of which is a hill 225 feet high, with a stone monument on it. This channel is half a mile wide and has from 20 to 30 fathoms of water through its center. Northward of the last-mentioned island is another passage, which is not recommended and is marked "Dangerous" on the charts of the United States Hydrographic Office. It contains many sunken rocks and rocks awash, with deep water close to them. On the north side of this passage is a group of islands, varying in height from 90 to 125 feet, with deep waters and no dangers between them and the mainland. The northern passage lies between Smith's island (which is the northernmost and largest of the islands lying off the entrance to Angeles bay) and a long narrow neck of land that makes off in a southeasterly direction from the mainland and is terminated by a rocky bluff. When up with this bluff, the passage lies between it and the group of islands before mentioned. The northern passage is over a mile in width and free from dangers, except at a point about midway of the length of Smith's island, where some dangerous rocks, lying three-quarters of a mile from the island, narrow the channel to nine-tenths of a mile. Over 10 fathoms water can be carried through it.

Neither of these passages should be attempted, unless in an emergency, when the land cannot be plainly distinguished, as that is the only guide for using them.

**Fresh water** can be obtained from springs near the anchorage, at the foot of the round-topped mountain; their situation is marked by a growth of weeds and bushes. The bay abounds in fish and turtle, and good oysters can be gathered along the rocky shores. Banks of pearl oysters are also reported to exist. The country in the vicinity is said to be rich in copper ores, sulphur, and argentiferous lead. In the northern part of the bay is a deep bight, formed by a narrow neck of land that projects 3¼ miles in a southeasterly direction from the mainland. This bight has not been examined.

**Remedios bay.**—An anchorage can be found here with shelter from the northwest winds. The best anchorage is off a red hill a third of a mile from shore in 10 fathoms, Remedios Point bearing N. 30° E.

**Angel de la Guardia island** is high, rocky, and barren. The western side bordering on Ballenas channel is inaccessible and without an anchorage. The eastern side is very irregular in its outline. There are several open bays where vessels may anchor.

**Pond island.**—An anchorage can be had about 3 miles from the south point of this island, in from 7 to 9 fathoms, less than a quarter of a mile from shore.

**Rock point.**—An anchorage can also be had just south of this point, close in shore, in from 5 to 8 fathoms. Protection from NW. winds will be found.

**Puerto Refugio**, which extends over nearly the whole of the northern side of the island, is a fine large harbor, or more properly, two harbors, where good anchorage will be found with shelter from every wind. These harbors may be entered from three sides, and any of these entrances may be used with safety. The island of Angel de la Guardia is inhabited by great numbers of iguanas, and also abounds in rattlesnakes. The interior of the island was not examined, and no indications of fresh water were seen.

**San Luis Gonzales bay** affords a good anchorage, with protection from southeasters, but is open to the northward. The shore of the bay is a low sand and gravel beach. In the southern part is the arroyo Calamujet, on the bank of which, 12 miles to the southward, is the old mission of the same name, near which are some pools of fresh water.

**San Luis island** is small and of volcanic origin. There is a clear channel between it and the mainland. A low sand-spit extends nearly a mile from the SW. side of the island. A good anchorage can be found on either side of the sand-spit, taking care not to approach it on either side nearer than half a mile.

**San Felipe bay** lies just south of the point of the same name; it is small in extent, but affords some shelter from NW. winds. The water in the bay is quite shoal. The best anchorage is in the northern part. It is said fresh water can be obtained in this vicinity. Game is abundant in the interior.

**Lake.**—There is said to be in the vicinity of mount Calamahue a large mountain lake which feeds the various small streams that flow toward the Pacific coast.

**Indians. Gold.**—The Cocopa Indians, who inhabit some parts of this region, report the existence of gold there, and they occasionally come to the Colorado river bringing nuggets of pure gold with them, which they trade off. They do not permit white men to enter that part of the country which they inhabit, and thus far have succeeded in keeping undisputed possession of their treasure.

**Consag rock**, sometimes called Ship rock, is small in extent and covered with guano, which gives it a whitish color. The tidal currents cause heavy *rips* in this vicinity. This rock is an excellent mark for shaping a course to the mouth of the Colorado river.

**Colorado river.**—The entrance is much obstructed by mud flats, which are bare at low-water springs, but have navigable channels between them at high water. The main channel lies close along the Sonora shore.

**Santa Clara river** is only navigable at high water. At low-water springs it is dry, with here and there a pool of water.

**Port Isabel** is abandoned. The black beacon on Philip's point has disappeared and a temporary one has been put up in its place. None is really necessary, as the point itself is prominent and can be seen, except possibly at springs or floods.

**Caution.**—It will not do to trust to compass courses, as the currents will sweep you a long way off the line. The lead must be kept continually going, as the shoals and mud flats are subject to frequent changes. Do not enter the river on the ebb tide, but take advantage of the first of the flood.

**Currents.**—The tidal currents run with great strength at full and change of the moon, sometimes as much as 6 knots per hour, and there is no such thing as slack water. When leaving the anchorage, bound out of the river, start on the last of the ebb.

**Remarks.**—The Colorado river is navigable for light draught vessels as far as Colville, Nevada, which is about 600 miles above Philip's Point. The influence of the tide is felt for about 40 miles, up to a place a few miles above Heintzelman's point, and at a short distance above Philip's point, at or near the time of spring tides, comes in with a bore or bank of water 4 feet high, extending in one huge breaker clear across the river, while the ebb is still running out.

Above Philip's point the channel is crooked and obstructed in places by sand bars, some of which have at times not more than 2 feet of water over them. The channel retains an average width of nearly a half mile the entire distance to Colville. The winds at the mouth of the river are mostly from the northwest and in summer are very dry and hot.

The principal exports from the river are hemp, which grows wild in great abundance, argentiferous lead ores and copper ores. The river trade is in the hands of the Colorado Steam Navigation Company, which has three river steamers and three barges of from 70 to 100 tons burthen employed. These vessels draw about 1 foot of water when light and two feet when loaded.

# CHAPTER III.

## THE COAST OF MEXICO AND ADJACENT ISLANDS FROM THE MOUTH OF THE COLORADO RIVER TO CAPE CORRIENTES.

The coast of Mexico from the mouth of the Colorado river to cape Corrientes, bordering partly on the gulf of California and partly on the Pacific ocean, is for the most part low and sandy, although there are many places where the mountains approach it closely. In the distant interior may be seen the summits of the Sierra Madre and of the high mountain ranges branching off from it.

The Mexican provinces on this coast are, commencing at the Colorado river, Sonora, Sinaloa, and Jalisco, having together a population of 1,255,000. The climate is temperate and the interior of the country is fertile, but the principal sources of wealth are the mines of gold and silver that are found almost everywhere.

There are many places along the coast where vessels may anchor, and several important ports, among which are Guaymas, Mazatlan, and San Blas.

The depth of water off this coast is in general much less than that off the western coast of the gulf of California.

The islands off the coast are generally barren and uninhabited. Tiburon island, in the upper part of the gulf, is inhabited by the Seris tribe of Indians.

**Currents.**—The information regarding the currents along this coast is rather meager, and the statements somewhat contradictory. They probably depend almost entirely on the winds, southerly currents predominating.

Between Guaymas and cape Corrientes, during the rainy season (from May to November), they are strong and irregular. Northerly currents are frequently encountered at that season. Tide rips are often seen along the edge of the shoals that lie off this part of the coast.

**Rocky Point bay.**—An anchorage may be had in from 5 to 7 fathoms on a line between Rocky bluff and Rocky point. The shore is sandy and covered with bushes.

**George's island** is a barren rock. Some rocks above water and awash extend from it in a NW. direction. The island is covered with guano, and immense numbers of sea-fowl inhabit it. A great many seals were seen along the rocky shore. A fair anchorage can be found to the northward of the island in 3½ fathoms of water.

**San Ignacio river** has an extensive shoal off it, over which the sea breaks heavily at times. The river as it approaches the coast loses itself during the dry season in the sand, only breaking through to the gulf during the rainy season. Near the south bank of the river, about a mile from the coast, are some Indian huts and a well; fresh water may be procured at all times just back of the sand hills. The banks are covered with vegetation and game is plentiful in the vicinity. About 75 miles from its mouth is the town of El Altar, and 69 miles beyond is San Ignacio, with its renowned mining district (gold and silver). The mouth of the river is readily distinguished by the break in the sand hills, through which it passes to the gulf. The northern extremity of the coast range of mountains is just south of the river.

**Cape Tepoca—bay and anchorage.**—Cape Tepoca, a low rocky point, is of a reddish color. A good anchorage can be found in Tepoca bay in 5 to 6 fathoms, half a mile from shore.

**Libertad anchorage.**—Two and a half miles eastward of cape Lobos is a low projecting point; between the cape and the point is the anchorage. Back of the point are some houses, one of which is the custom-house.

**Libertad** is a shipping point for some of the agricultural and mineral products of the province of Sonora.

**Sargent's point** is a barren, rocky hill. The coast between it and cape Tepopa is low. Just west of the point a curve in the coast line forms a small bight, where a tolerable anchorage may be had in 7 fathoms half a mile from the shore.

**Patas island** is small in extent. A deposit of guano gives it a whitish appearance. The passage between it and the main land, also between it and Tirburon island, is perfectly safe. There is an anchorage on the southern side with some protection from NW. winds, in 5 fathoms, sandy bottom, a quarter of a mile from shore.

**Tiburon island** is the largest island in the gulf of California. A narrow intricate channel separates it from the mainland.

**Fresh-water bay,** on the northern side, affords an anchorage in from 5 to 7 fathoms three-fourths of a mile from shore.

**El Infiernillo.**—The island is separated from the mainland by a channel called El Infiernillo. In the southern part of this channel is from 5 to 7 fathoms and comparatively free from shoals, but in the northern part it is shallow, and full of shoals and sand spits. It is unsafe except for the smallest class of vessels.

On the north side of SE. point of the island is a good anchorage in 5 to 6 fathoms. A sand beach at the junction of the peninsula with the main body affords a landing.

**Seal rock.**—There are numerous outlying rocks surrounding it, but there is a clear passage about a quarter of a mile wide between it and Monument point. Between Monument point and Red Bluff point

there is a small bay open to the southward, in which is a good anchorage in from 5 to 6 fathoms a quarter of a mile from shore.

**Willards point** is the SW. point of Tiburon island. There is said to be a tolerable anchorage 1½ miles to the eastward of it in 7 fathoms close to the shore.

**Remarks.—Hostile Indians.**—During the greater part of the year Tiburon island is the resort of the Seris (or Ceres) tribe of Indians, who inhabit the adjacent mainland, and their huts and encampments can be seen in many places along the shore, principally on the eastern side of the island. They are reputed to be exceedingly hostile, and use poisoned arrows in opposing the landing of strangers on what they consider their domain, but during the stay of the Narragansett in the vicinity they were friendly. At first they were shy and made threatening gestures, but soon, finding that no harm was intended, they became friendly, and returned visits made to the shore by frequent and lengthy calls on board ship. They are very expert in hunting with the bow and arrow and in catching fish and turtle, which abound in the surrounding waters. A species of large deer is found in great numbers on the island. A rich bed of pearl oysters is said to exist in the channel between the island and the coast of Sonora, and there are reports of rich gold mines on the island, but these reports need confirmation.

**Kino bay** lies just north of the point of the same name. The greater part of this bay is shoal, but small vessels can anchor in it and find shelter.

**The Sonora river**, which rises near the southern boundary of Arizona and with its tributaries drains the greater part of the province of Sonora, divides into several branches, which disappear in the low country surrounding La Cruz lagoon. Ures, the capital of Sonora, and Hermosillo, an important city, are situated on the banks of the Rio Sonora. The Rio de la Poza, which, like the Rio Sonora, divides and disappears in the San Juan Bautista flats during the dry season, overflows them in the wet season, carrying vast quantities of sand into the gulf and creating extensive shoals along this part of the coast. Twenty-two miles southeastward from Kino point is a shoal.

**Caution.**—Care should be taken to give this shoal a good berth, as appearances seem to indicate that it is increasing in extent to the southwest and west. Only 6 fathoms of water are found 5 miles to the westward of the low sand point.

**The Estero de Tastiota** has a narrow entrance, through which only 3 feet of water can be carried at high tide. Outside the entrance the water is shoal for about a mile off shore; inside it expands to a considerable size, trending to the northward, a range of hills rising behind it. Fresh water may be obtained near the head of the estero.

**Anchorage** may be had in good weather off the mouth of the estero de Tastiota in 6 or 7 fathoms of water half a mile off shore.

**San Pedro bay** is a small cove lying to the southeastward of the point of the same name. The entrance, which is three-eighths of a mile wide, lies between two steep rocky heads, and has a depth of from 5 to 8 fathoms. The head of the bay, which is somewhat less than half a mile from the entrance, is a sand beach, with a range of hills lying back of it. The soundings decrease gradually towards the shore.

**Anchorage** will be found about midway of the entrance, in from 5 to 6 fathoms of water, with shelter from the northwest winds.

**San Pedro Nolasco island** is a barren rock of volcanic origin lying to the southwestward of San Pedro point. There is a place on the SE. side where a landing can be effected; in every other part it is inaccessible. Some deposits of guano are said to exist on this island. Off the southern end close to are some outlying rocks.

**Las Tetas de Cabra** are two remarkable peaks, situated about a mile and a half to the eastward of point San Antonio and less than half a mile back of the beach. They resemble, as their name implies, a goat's teats, and are a valuable landmark in making the port of Guaymas.

The passage between San Nicholas island and the mainland is considered dangerous, being full of islets and rocks.

**The Ensenada de Bochibambo** is an open bay. Fresh water, beef, fruit, &c., may be obtained. Back of the eastern shore of the bay is a lagoon which only boats can enter.

**Cape Haro** is the southern extremity of the peninsula on which Guaymas is situated.

**Currents.**—There are many conflicting reports regarding the strength and direction of the currents off this part of the coast, but it is evident that they depend greatly, if not entirely, on the force and direction of the wind.

**San Vicente island** was formerly known as Trinidad. The name Trinidad was probably given to it from the fact that, in connection with a large outlying rock to the northward, it appears from a short distance like three separate islands.

**Guaymas harbor** may be considered as divided into two parts—an outer harbor for vessels of 20 or 22 feet draught, and an inner one for vessels of not over 15 feet draught. The outer harbor occupies a space inclosed between Punta Baja and Morro Ingles on the east, and the islands of Almagre Grande and Ardilla on the west. The inner harbor lies inside of the islands just mentioned, between them and the mainland.

**Punta Baja** lies about $\frac{7}{8}$ of a mile to the northwestward of the SW. extremity of Pajaros island, the channel between having a depth of from $5\frac{1}{2}$ to 7 fathoms. It is a rocky bluff point with some outlying rocks close to; back of it the land rises gradually.

**Morro Ingles** is a solitary rocky hill situated at the western extremity of a long, low, narrow strip of sand beach, known as the Playa

de las Dolores. It bears N. 11° E. from Punta Baja, and is ¾ of a mile distant from it, the navigable channel between them being half a mile wide, with a depth of from 3 fathoms near the shore on either side to 5½ and 6 fathoms in the middle. A shoal, which is partly bare at low water, extends 600 yards westward from the Morro Ingles.

**Boca Chica.**—Between Pajaros island and the Playa de las Dolores is a passage through which 12 feet draught can be carried. This passage is known as the Boca Chica.

Vessels of over 22 feet, should anchor between Pajaros island and Punta Baja, in 6 fathoms. The land in the vicinity of Guaymas having been once seen, cannot with ordinary care be mistaken. Cape Haro and Las Tetas de Cabra are the best landmarks, and are not easily mistaken by an entire stranger.

**Guaymas** is surrounded by high mountains, and is extremely hot in the rainy season. The fevers prevalent at San Blas and Mazatlan prevail here, but in a lesser degree. The population in January, 1885, was about 7,000, most of whom were in a state of wretched poverty, the entire business of the place is monopolized by a few wealthy firms and individuals. There is a regularly appointed sanitary commission, a military and civil hospital, and a garrison of 250 men. A number of Yaqui Indians (about 500) occupy one section of the city. These Indians are very intelligent and possess considerable mechanical ingenuity. They are experts in saddlery and the manufacture of straw goods; their earthenware is of good quality, and the serapees (shawls), which they weave by hand, are unsurpassed for beauty and fineness of texture.

Within the city are a number of fine structures of the architecture peculiar to the country, and a few of the American style. The climate from November to April is pleasant, but the heat during the summer months, from June to September, is excessive, the mercury reaching 105° to 110°,and seldom falling below 97° or 98°. When the hot winds visit the town, as they often do in the summer months, it frequently reaches 135°.

**Supplies.**—Fresh water of an indifferent quality can be procured at a cost of 1½ to 2 cents per gallon. Excellent flour, fresh bread, and beef can be obtained in any quantity at moderate prices. Good oysters from the Yaqui river are found in the market at the proper season. No salt provisions or ship's stores can be purchased. At the time of the Narragansett's visit the Colorado Steam Navigation Company had a small amount of coal for steaming purposes.

**The exports** are wheat, corn, flour, cotton, tobacco, unrefined sugar, aguadiente, dried beef, hides, gold, silver, and copper.

**The imports** are the products of the more southern provinces, with East Indian and European manufactured goods.

There is a street railroad in the city.

**The Sonora railroad** connects Guaymas with the interior and California, giving daily communication. Real estate and mines have in-

creased in value since this road commenced operations. The railroad is building a fine hotel at a cost of $100,000.

**Steamers.**—The California and Mexican Steamship line makes regular monthly voyages to this port from San Francisco. This company receives a subsidy from the Mexican government of $2,000 the round trip. The Mexican steamship line, called the Gulf of Cortez line, is supposed to make trips every twenty-one days, touching at Manzanillo, San Blas, La Paz, Mazatlan, Altata, and Guaymas. It receives $1,500 subsidy the round trip, but is not regular. The Mexican steamer Altata, of 60 tons, belongs to the Sinaloa and Durango Railroad Company, and makes monthly trips between Mazatlan and Guaymas, touching at Altata and Agiabampo.

The telegraph line is owned by the Mexican government.

The United States is represented by a consul and vice-consul.

**Mails.**—There is a daily mail with the United States by rail and a monthly mail by sea to San Francisco, as well as one every fortnight to the coast ports south.

**San José de Guaymas** lies on both sides of the Estero del Rancho, 1½ miles from its mouth. It is inhabited by civilized Indians of the Yaqui tribe. The country in the vicinity and far into the interior is level and sandy.

**Hermosillo** is the principal town in this part of Sonora. It is situated north of Guaymas, distant from it by the road 84 (statute) miles, and lies in a gap which the Rio Sonora has cut through the western range, surrounded by high hills. It has a population of about 14,000, and is the center of an important silver-mining region. There is a mint for coining silver dollars. Cotton goods and brandy are manufactured to some extent. Maize, cotton, and fruit are exported by way of Guaymas, which is its seaport.

**Soundings** obtained off this part of the coast show a less depth of water than is given on charts made from former surveys. Four and five fathoms only were found in places where the charts gave 6 and 7 fathoms. This would seem to indicate that the mud and sand brought down by freshets in the streams of this vicinity are deposited in the outer bay of Guaymas, and not carried off by the coast currents.

**San Marcial,** 60 miles up the Rio de Matape, is the nearest place to Guaymas where coal is found, and in the future it may be of importance to the prosperity of that place. At present the difficulties of transportation are too great to make working the mines profitable.

**The Yaqui river** is the largest stream in the province of Sonora, and is indeed the only one deserving the name of river. It rises in the mountains near the Arizona boundary, and flowing in a southerly direction empties into the gulf of California, about midway between cape Haro and Lobos point. The mouth of this river is filled with shoals and sand bars, and in the dry season it is navigable only by the smallest coasters. It has three outlets, which from a short distance

appear like lagoons. A sand bank over 2 miles long and from a quarter to half a mile wide, over which the sea breaks, extends across its mouth, having passages at either end between it and the shoals.

**Coal.**—There are said to be extensive fields of an excellent quality of coal on both sides of the Upper Yaqui, which may give it some importance in the future.

**Currents; fogs.**—Strong currents, variable in direction, are often encountered in this vicinity, and fogs are of frequent occurrence.

**Lobos point.**—Southward of this point vessels can anchor, in good weather, in 6 fathoms, half a mile from shore.

**On Lobos island** is a remarkable green mound, between which and the point is a solitary palm tree serving as a landmark for the coasters.

Vessels can anchor anywhere along the coast between Lobos point and Ciaris island, in fine weather, taking care not to approach the land within 3 miles, or get in less than 6 fathoms of water.

**Arboleda point**, on Ciaris island, has some clumps of scrubby trees which serve as an excellent landmark, they being the only ones in this vicinity.

**Santa Barbara bay** affords an excellent anchorage in NW. winds, but is open to SE. winds. The best anchorage is almost a mile east of the point, and some distance from shore, in 7 or 8 fathoms.

**The Estero de Agiabampo** is an extensive lagoon, the entrance to which is narrow and intricate, being obstructed by shoals and sand bars, which extend about a mile off from the general coast line. The least depth found in the channel at low water was 2 fathoms. On either side were shoal patches, with from 3 to 5 feet of water, over which the sea broke heavily.

**The bar and channels** are undoubtedly subject to change, and the greatest care is necessary. The best time to enter the estero is with the first of the sea breeze. The best anchorage outside the estero is in 7 fathoms, 1¾ miles off shore.

**Agiabampo** is situated on the north shore of the estero, about 10¼ miles from the bar. It is a place of some importance, being the seaport of the cities of Alamo (40 miles distant) and Fuerte (45 miles distant), with both of which it is connected by roads. It has a custom-house, and exports treasure, silver ore, and dye-wood.

**The Rio del Fuerte** or de Santa Maria de Ahome forms part of the boundary line between the provinces of Sonora and Sinaloa. During the rainy season it is much swollen and large quantities of dye-wood are floated down.

**San Ignacio bay.**—There is a good anchorage in from 5 to 6 fathoms, half a mile to a mile from the northern shore, with protection from NW. winds.

**The Farallon de San Ignacio** is the best landmark for making the entrance to Topolobampo harbor. There is deep water close to, on all sides of it except the northern, where there are a few outlying rocks close to.

**Topolobampo harbor.**—The entrance is between two lines of breakers, and is very narrow and intricate. The channel is the only part of the harbor that is navigable for vessels of any size, the other parts of it being very shallow and full of shoals. There is an excellent anchorage inside the shoals in 7 or 8 fathoms. The best anchorage outside the bar, which is safe only in moderate weather, is in 8 to 10 fathoms, with Round hill bearing N. 45° E. The nearest breakers will then be half a mile to the eastward. The bar and shoals near the entrance appear to have changed considerably since 1869, at which time a survey was made by the U. S. S. Jamestown.

In ordinary weather the sea breaks in 1½ fathoms, but with fresh southerly or westerly winds it breaks entirely across the bar. The tidal currents on the bar and in the channel are strong, and care is required to keep on the ranges.

**Remarks.**—It is said that fresh water may be obtained by sinking wells in the sand near Shell point. Fish and turtle are abundant in the waters in the vicinity, and game is said to be plentiful in the interior. The vegetation in the vicinity of the harbor is very scanty.

**San Carlos bay** is large and lies to the northeastward of Topolobampo harbor, being connected with it by a narrow strait or channel. It has never been surveyed, but is known to extend 9 or 10 miles in a northeasterly direction and to have a width of from 4 to six miles.

After rounding the high headland on which mount San Carlos is situated, a narrow intricate channel, with a gradually decreasing depth of water, was followed for about 3½ miles in a northeasterly direction. At that distance 3 fathoms were found. On either side of the channel the soundings were irregular, varying from 3 feet to 3 fathoms, with numerous sand bars and a few small islands.

**Navachista estero** has a narrow and intricate entrance, with about 2 fathoms on the bar at low water. Inside the bar there are from 5 to 7 fathoms. This bar, in common with all others on this coast, is subject to change and must not be implicitly relied upon.

Previous to 1875 the entrance had been gradually shoaling and becoming more intricate, and the town of Navachista, some distance in the interior, was, in consequence, fast becoming depopulated, its rival, Playa Colorado, about 24 miles to the southeastward, increasing to a corresponding extent.

**On Vinorama island** are several cotton farms or ranches, and tolerable fresh water can be obtained by sinking wells.

**The Sinaloa river** empties into the gulf on either side of a small island covered with trees, the center of which is 4¾ miles from the eastern end of Macapule island, is useless for the purposes of navigation. A shoal makes off about half a mile from the island at its mouth, and the discolored water from the river is very marked for some distance.

**The old town of Sinaloa,** built on a hill, is situated on the bank of the river, about 40 miles from its mouth. It was formerly of some importance, but it is now almost deserted.

**The entrance to Playa Colorado estero** is to the south-eastward of the island, at the mouth of the Sinaloa river. Off it are extensive shoals, over which the sea breaks even in moderate weather. The depth of water on the bar is said to vary with the seasons, 9 feet being found at low water during the dry and 12 feet during the rainy season. As the bar is shifting, no directions that will hold good at all times can be given, and the only safe way is to sound out and mark the channel before attempting to enter. The deep water lies between the lines of breakers and they are the best guides. Inside the bar the breakers are the best guide.

**The village of Playa Colorado**, containing about 200 inhabitants, is situated 4 or 5 miles from the mouth of the estero of the same name. Large quantities of dye-wood are annually shipped from here.

The shore is low and dangerous to approach, as it cannot be seen at night before striking on the shoals that make off from many parts of it. The lead should be used freely, as the soundings are an excellent guide, and it is recommended not to get in less than 13 or 15 fathoms of water when navigating this part of the coast at night.

**The entrance to Altata estero** lies between the southeastern end of Baredito island and the northwestern end of a long narrow island. It is only about 200 yards in width at its narrowest part, and is marked on either side by lines of breakers.

**The bar** had, in 1869, between 3 and 4 fathoms on it at low water, but it is probably subject to change, as some reports give only 2¾ fathoms.

**Currents.**—The tidal currents in the channel occasionally have a strength of 4 or 5 knots.

**Altata**, the sea-port of Culiacan (the capital of Sinaloa), is situated near the mouth of the Culiacan river, which is reported to be navigable for a distance of 10 or 12 miles from its junction with Altata estero, having an average depth of about 5 fathoms; large quantities of dye-wood are shipped from here.

**Supplies.**—There is but a poor supply of drinkable water to be obtained and provisions are scarce; cattle can be procured from a neighboring ranch.

**The Sinaloa and Durango railroad** ends here. A small steamer, the Altata, belonging to the railroad, is employed in making trips between this place and Mazatlan, carrying bullion and passengers. It also makes regular trips to Guaymas.

The United States is represented by a consular agent.

**Boca Tavala** is a narrow outlet from the lagoon, probably caused by the rush of water from the Rio Tavala or San Lorenzo, which empties into the lagoon a short distance to the northeastward. A shoal with 3 fathoms on its outer edge extends 1¼ miles off the entrance. The anchorage is in 6 or 7 fathoms, 2 miles from the beach.

**Tavala or San Lorenzo river.**—During the dry season this river is only navigable for coasters drawing not more than 5 feet. On its right bank, about 15 miles from its mouth, is the small town of Quila, and 8 miles farther up, the town of San Lorenzo.

A sweep in the coast line between the mouth of the Piastla river and the northernmost of the two headlands forms a small bay or indentation, open to the northwestward, where vessels that come here for dyewood anchor, in 5 or 6 fathoms, about a mile from the shore. A short distance eastward of the extremity of the northernmost headland is a landing-pier with some huts back of it. On a hill back of the pier is a signal pole.

**Islet.**—On a line between point Piastla and the mouth of the river of the same name, a quarter of a mile from the northernmost point before mentioned, is a white, rocky islet 35 feet high.

**Supplies.**—Drinkable water can be obtained at a short distance from the beach, from a lagoon, which is dry during the months of March, April, and May. Two wells sunk on the shore of this lagoon serve as cisterns or reservoirs. Not far from the landing-place is a fertile plain, where cattle can be obtained.

**Piastla point.—Reef.**—A reef extends 1½ miles west of point Piastla. Do not pass too close to this point in calm weather. There are no breakers. The current sets with great force to the southward.

**Mazatlan harbor.**—The available part of the harbor of Mazatlan is of small extent and includes the space lying between the island of Creston on the west and Ciervo on the east. It affords good protection from the northwesterly winds, but is entirely open to the southward, and is a dangerous anchorage for sailing vessels during the rainy season.

**The buoy on Blossom rock** is not to be depended upon. It sometimes disappears, and is sometimes out of position.

**Caution.**—During the bad weather season, September and October, it may be well to anchor farther out, or to the northwestward of Creston, where there is more room for sailing vessels to get under way and, in the event of being obliged to do so, to stand out clear of the land.

**Landing.**—In approaching the pier off the custom-house strangers should give the shore a good berth and pull for the end of the pier, as there are several sunken rocks lying a short distance off, on which boats would strike at half tide.

The inner or northern part of Mazatlan harbor is full of sand bars and shoals. It can only be used by vessels of the smallest class.

**Pilots, harbor dues, &c.**—Tonnage dues, $1 per ton when loaded; if in ballast none; bill of health, $4; captain of the port, $4; pilotage $1.75 per foot and $5 for a boat; custom-house papers, $25 to $30; ballast costs $1.50 for sand and $2 for stone per ton; laborers, $2 per day; lighterage and landing cargo is at merchant's expense; costs from $1 to $1.50 per ton. Weights and measures are those of Spain.

During the stay of the Narragansett, from the 6th to the 8th of February, light northwesterly winds were experienced during the day, succeeded by calms at night. The thermometer ranged from 70° to 75° Fahr. During the summer months calms are of frequent occurrence, and the thermometer reaches 100° and over.

**Mazatlan**—the official name of which is La Villa de los Castillos—is the only seaport of importance in the province of Sinaloa. It presents a picturesque appearance, the houses being light colored and in the better part of the town handsome and commodious. It is considerably larger than Guaymas, having a population of about 15,000, which varies with the seasons, being far greater in the dry season than during the rainy one. It is less unhealthy than San Blas, but severe fevers are common during the rainy season.

It is the outlet for the products of the valuable mining districts of San Sebastian, and large quantities of English goods are imported directly from England. The trade is almost entirely in the hands of foreigners, who realize considerable profit from it. The city is well regulated, has a board of health, a civil and military hospital, several public schools, and a reading room organized by foreigners. Next to Acapulco it is the most important city on the Pacific coast between Panama and San Diego.

**Supplies.**—Everything in the way of equipment or provisions that vessels require can be procured here. Fish, oysters, and turtle are plentiful. About 1,500 tons of coal are kept on hand, the price of which is $15 per ton at the coal pile and $17.50 per ton delivered alongside. It is bagged, and brought off in lighters towed by a tug. The coal pile is about 1½ miles from the anchorage. There are two large machine shops, where repairs to steamers may be made. There is a dry-dock building. Loaded vessels are taxed for the maintenance of the lighthouse; vessels entering in ballast are exempt.

**Steamers.**—The Pacific Mail steamers and the California and Mexican line call here once a month and the Mexican Steamship line every twenty one days.

There is telegraphic communication with the United States and South America.

**The exports** are dye-woods, fine pearls, gold, and silver.

**The imports** are mining machinery, fruits; vegetables are brought from San Francisco; cotton fabrics are brought from Europe.

The United States is represented by a consul and vice-consul.

**Camichen estero** is the outlet of an extensive lagoon, which stretches northward. Off the entrance is a bar, over which the sea breaks. On the western shore of the lagoon, just north of the entrance, is a small settlement. Vessels come here for cedar and dye-wood.

The usual anchorage is off the mouth of the estero, in 5 or 6 fathoms of water, about a mile from the shore.

**Asadero estero** is 7½ miles from that of Camichen, and has a shoal of small extent off it. The anchorage is in 5 or 6 fathoms of water, about half a mile from the beach. Vessels come here for cedar, dye-wood, &c.

**The Rio Grande de Santiago, or de Lerma,** which takes its rise near the city of Mexico, feeds on its course Chapala lake (over 50 miles long, and, draining the larger part of the province of Jalisco, flows into the Pacific about 4 miles to the southeastward of Asadero estero. Guadalajara, the capital of Jalisco, is situated on the south bank, about 140 miles from its mouth.

A dangerous shoal, over which the sea breaks heavily, extends nearly 2 miles off its mouth.

**Piedra Blanca del Mar** is a small white rock, near which from 8 to 9 fathoms of water will be found. There is a safe passage between the rock and the shoal off the mouth of the river.

This rock is a good guide for making the port of San Blas, which is about 12 miles distant.

**The harbor of San Blas** is nothing more than a small estero, having throughout the greater part of its extent very shoal water. The bar at its entrance has 7 feet of water on it at low tide. Inside, this depth increases to about 3 fathoms at low water. Vessels must moor, head and stern, in the estero, which is very narrow, and is perfectly sheltered from every wind.

The western shore of the estero is a narrow neck of land, or peninsula, in the southern part of which are some hills over 100 feet high, with the ruins of fortifications on them.

By giving this point, which forms the harbor, a berth of 15 or 20 fathoms you will avoid a large stone, which is awash at low water, and is about 15 yards from the dry part of the rocks or breakwater. As soon as you are so far in that the innermost or eastern part of the breakwater is in line with the other part of it inside, which runs to the NNE., it may be approached to within 10 or 15 fathoms, and by keeping well off from the low sandy point, as you warp up the harbor, you will have the deepest water. As the sea sometimes in the rainy season, although seldom, breaks over the natural breakwater which forms the harbor, it is best to moor close under the high part of the land, on which stand the ruins of an old fort, with the ship's head up the river, a bower laid off to the eastward and an anchor from the starboard quarter, the port side secured to the shore, either by taking out anchors or by making fast to the rocks. In this position it is next to impossible for any accident to happen to the ship; the cargo can always be discharged with dispatch immediately under the eye of the master or mate, and the landing place is only 200 yards from the ship. The longboat will do more in this anchorage than the two launches, which can never be used in the outer harbor in rough weather.

As there are no established pilots it is advisable to engage a person to point out where the large stone lies. The captain of the port is the

best person to apply to, who, if he will not come off himself, will most likely recommend a suitable person.

**The outer anchorage of San Blas** is open and exposed to both the prevailing winds. It is safe in the dry season, and less dangerous than that of Mazatlan in the rainy months. The extent and configuration of the roadstead render it easy of approach, and when leaving it the prevailing current often affords considerable assistance. It is recommended to avoid remaining during the season of the *cordonazos*.

The best anchorage is in 5½ to 6 fathoms of water, Piedra Blanca de Tierra bearing N. 26° W., distant about half a mile.

**Caution.**—Care must be taken in standing in for San Blas not to fall to leeward, as there is a strong southerly current setting along the coast during the greater part of the year.

Coming from the southward steer for the westernmost hill, Castillo de la Entrada, until approaching Piedra Blanca de Tierra, when anchor as before directed.

San Blas at present has about 3,500 inhabitants and is the port of entry for Tepic and Guadalajera and the center of the trade in precious woods, as rosewood, mahogany, cedar, lignum-vitæ, Brazil wood, &c.

The old town of San Blas is at present a mass of ruins, with trees and bushes growing among them.

**Fevers, &c.**—During the rainy season malignant fevers prevail, the effects of a marsh miasma generated in the numerous surrounding swamps; there are also myriads of mosquitoes and gnats, whose stings often cause painful and serious inflammatory disorders. At this season every one who is able, leaves the town for the interior.

**Remarks.**—The following remarks are from Imray's North Pacific Pilot, Part I:

"On November 1 the dry season commences; the temperature rises steadily, and the land yields all its moisture, until, by the month of May, the heat of the atmosphere resembles that of an oven, and the air swarms with mosquitoes and sand flies; the sky is cloudless, the land and sea breeze regular but not refreshing.

"Early in June heavy banks of dark lowering clouds, charged with electricity, collect on the high lands in the interior; lowering masses of clouds hang to seaward. The change is fast approaching, and before the 16th of June the rains commence and deluge the land, accompanied by heavy squalls and a tumbling swell from seaward.

"For the first month or six weeks the parched land absorbs the rain, but by the middle of August it becomes moist and swampy, the haunt of alligators and aquatic birds. In September the action of the sun on water-soddened land generates fever of the most violent nature, and it behooves those who arrive early in the dry season to be careful of exposure to the malaria."

**Supplies.**—Fresh beef, vegetables and wood can be obtained here. Water of excellent quality is found near the shore of Enseñada Matenchen, 3 miles to the eastward of San Blas.

**Steamers.**—The Pacific Mail steamers touch here once a month, and the Atchison, Topeka and Santa Fé Railroad Company's steamers make regular semi-monthly trips from Guaymas to Manzanillo, touching at La Paz, Mazatlan, and San Blas.

The United States is represented by a consul and vice-consul.

**Las Tres Marias islands** are fifty or sixty miles off this part of the coast, of volcanic origin, and their western sides are high, inaccessible, barren cliffs, while the eastern sides are generally low and sandy, with some vegetation.

**Maria Magdalena island.**—There is considerable vegetation on this island, although the soil is of a sandy nature. The most valuable of its products is lignum-vitæ, besides which there is an almost impenetrable thicket of small trees and bushes, together with the prickly pear and some plants of the orange and lemon species. Fish are abundant near its shores.

**Maria Madre island** is the largest of the group. On the SE. face is a small settlement of fifteen or twenty people who are occupied in collecting salt from a lagoon near by. The salt is shipped to Mexico. Fresh water of an inferior quality can be procured by sinking wells on this part of the island.

**Caution.**—Calms, eddy winds and southerly currents must be guarded against when navigating the channels between these islands.

**Jaltemba Bay anchorage.**—Vessels can find anchorage here. The shore is sandy and the land back of it is covered with a thick growth of trees and bushes. Dye-wood is shipped from here. A little over a mile to the eastward of Punta Raza is a small fresh-water stream.

There is an excellent anchorage during the season of the NW. winds 1½ miles eastward of Punta Mita, in from 5 to 7 fathoms, from half to three-fourths of a mile off shore. Fresh water in small quantities can be found near the beach. Game is abundant in the interior. A species of wild turkey, called by the natives *chacalaca*, is found in large flocks, furnishing excellent meat. Parrots of beautiful plumage cover the limbs of the trees and fill the air with their chattering.

**Corvetena rock** is of whitish color, and in a clear day can be seen 8 or 10 miles. A strong current was noticed in its vicinity setting S. 45° E.

The southern shore of Banderas bay is high and precipitous, with occasional valleys and sand beaches, where small fresh-water streams empty into the bay.

**Rio Real.**—There is an anchorage in good weather off the mouth of this river, close to the beach. The soundings deepen very quickly, *no bottom* at 25 fathoms being found 400 yards from the beach. Vessels come here for dye-wood. Fresh water can be obtained from the river.

**Corrales harbor.**—West of Tabo bay, separated from it by a high hill, is the so-called harbor of Corrales, the western limit of which is only half a mile from cape Corrientes. It is about half a mile in extent but affords no anchorage.

A sunken rock, on which the sea breaks in rough weather, lies off the mouth of the harbor about 600 yards from the shore.

**Cape Corrientes**, the southern point of the entrance to Banderas bay, is a bold headland 506 feet high, the land a short distance back of it rising to a height of 2,000 feet. There is a large outlying rock close to the cape. Soundings obtained 600 yards from it gave 145 fathoms.

**Current.**—Capt. W. H. Parker, of the Pacific Mail Steamship Company, says: "The current runs from cape Graham along the coast toward cape Corrientes, generally about NW., but sometimes setting north with considerable velocity into Natividad, Tenacatita, and Perula bays. You may be cut in a good deal and must look out for it."

**Revilla Gigedo islands** consist of four islands lying between 18° 20′ and 19° 20′ N. lat., and 110° 45′ and 114° 50′ W. long., are of volcanic origin.

**Socorro island**, the largest, may be said to consist of one mountain covered with a thick growth of cactus, which renders it almost impossible to penetrate the interior. A species of bean grows on a vine which runs along the ground. Captain Colnett's men are said to have become very sick from eating it. No indications of fresh water were seen, but it is said there are goats on the island, which would hardly be the case if no fresh water could be found. Fish, turtle, crabs, and crawfish were abundant.

**Braithwaite bay.**—There is a good anchorage in this bay during the fine weather season, that is from December to June. The bay is readily distinguished by a *stony beach*, the only one on the south side of the island.

Wishing to anchor, bring the highest peak of the island to bear N. 24° W. and anchor in 10 or 11 fathoms a quarter of a mile from the beach. There is a good landing on the beach at the head of the cove.

**Cornwallis bay** affords a good anchorage in easterly winds. It is necessary to anchor quite near the white coral beach, as the water deepens quickly off shore.

**The eastern side of the island** consists of perpendicular bluffs with no landing place, even in the finest weather.

**Remarks** —The following remarks are from Findlay's North Pacific Directory: "Captain Colnett considered the safest anchorage from June to December to be between the S. and SW. points (Cornwallis bay), opposite to two white coral beaches, which are the first two in succession from the south point towards the west. It is remarkable from the pinnacle rocks which lie close off the west point of the bay. This bay is preferable in the bad season, as the wind seldom blows more than two points to the southward of east. In the good season, however, that is, from the latter part of December until the beginning of June, the SE. (or Braithwaite bay) is to be preferred; the anchorage here is better and nearer the cove, and is the only good landing place. It is readily known, being a stony beach at the first inlet in the shore to the eastward of the

south point. All other points of the coast on the south side of the island are iron bound, which makes it difficult if not impossible to land."

**San Benedicto island.**—On the eastern side, near the middle, is a small shingle beach where a landing may be effected in good weather.

**Rosa Partida**, a dangerous, barren rock, lies 67 miles N. 80° W. from Socorro island. The low part not being visible very far, has the appearance of being two separate rocks, while from a distance it looks like a vessel under jury masts.

**Clarion island** is, like the others, of volcanic origin. On the south side are two indentations, with sand beaches, the only two places of the kind on the island. Sulphur bay is the westernmost of these two indentations, where good anchorage may be found in 12 or 13 fathoms. Near the beach is a salt lagoon, but no fresh water was found. As doves were quite numerous there must be fresh water on the island. Many varieties of sea-birds, fish, turtle, &c., were numerous in its vicinity.

**Soundings** obtained south of Clarion island gave 20 fathoms and over half a mile from shore, increasing to 40 and 50 fathoms at a mile distant. The current in the vicinity of the group is southerly and from half a knot to a knot.

**Reported islands and shoals.**—Careful search has been made for the many islands and shoals that have been reported in this vicinity at different times, without finding them or any indication of them.

# CHAPTER IV.

## FROM CAPE CORRIENTES TO SALINA CRUZ, TEHUANTEPEC.

**Cape Corrientes** is the southern point of the entrance to Banderas bay. It derives its name from the currents off it, which set to the northward and westward into the gulf of California, and is a bold headland with a flat summit. On approaching it from any direction the high land back of it is first seen. The mountains are covered with woods, which in the rainy season are green and in the dry season dark brown. From the northward and westward the cape does not present a remarkable appearance, but from the southward and eastward it is bold and projecting. It may also be distinguished by a white rock patch on the side of the slope, well down, and by the reddish brown rocks at the base, whereas the points near it are grayish bluffs and rocks.

**Ysatan point** is a about 3 miles to the eastward of cape Corrientes and is a grayish rock point, a sand beach intervening between them. It appears to be the farthest projecting point on almost any line of approach, and may be easily mistaken for cape Corrientes.

**The currents** off this point are the most remarkable on this coast. Capt. W. H. Parker, late of the Pacific Mail Steamship Company's service, says: "And here I must caution you against one of the most marked currents on this coast; the current running from cape Graham along the coast toward cape Corrientes generally about NW., but sometimes setting north with considerable velocity into Navidad, Tenacatita, and Perula bays. You may be cut in a good deal and must be on the ookout for it."

**Dangers.**—There are no dangers off the cape which cannot be seen, and a vessel can pass in safety within a quarter of a mile of it. There is a shoal or ridge to the westward of the cape with 50 fathoms on it, which has deep water both outside and inside of it; this may account for some of the tide-rips and broken water seen at times off this point.

**Landing.**—A heavy sea breaks on the beach so that landing is impossible, but a good landing may be had in Corrales bay about half a mile to the northward and eastward of the cape.

**Yapala point.**—On the southeastern side, where the sand beach begins, is a cove where small vessels can anchor and find shelter from all southerly and southeasterly winds. Anchor in about 5 fathoms of water, and be particular not to run too near some sunken rocks that lie about 30 yards from the beach near the left center of the cove. Larger ves-

sels may anchor farther out on good holding ground in 10 fathoms, with the white house bearing S. 76° E., and about one-half mile from the beach.

**The landing** is bad except in the cove, where natives have two or three canoes moored.

**Supplies.**—Vessels load here with logwood, &c. Eggs, chickens, and such produce can be obtained from the natives in small quantities.

About 1½ miles to the eastward from the point, indicated by a low place in the shore range of hills, is the closed mouth of a lagoon and near it a small village lying back from the beach but hidden by the trees. About 500 yards to the left of the lagoon and 150 yards from the beach stands a white adobe house among the trees; this is the only structure visible from the anchorage.

**Black Rock point**, so called from its appearance and the knob back of it, though nearly white from the deposits of gulls and other sea birds, generally shows black from seaward. The rock when first sighted appears well outside a low bluff point under a peculiar black knob which forms the western extremity of a shore range of hills that extend to the eastward, diverging from the coast. This knob is easily recognized from either side, making a good landmark for the locality of Black rock.

**Black rock** itself is irregular in shape and has a low rock just outside and close to it. There are also a few sunken rocks close to the inner side. Vessels may pass within one-fourth of a mile of the rock without danger. At the end of the sand beach to the westward of the point there is a stream or lagoon where boats may find a landing. On the W. side of the point, 3½ miles to the southward of Black point, are several huts and to the right of them is a large lagoon, mouth not open during the dry season, but which seen from seaward appears like a river mouth. In front of the huts and 200 yards from the beach is a low rock feet out of the water with sunken rocks near it, upon which the sea breaks. Off the southern side of the point is a cluster of rocks 2 or 3 feet high. Vessels should give them a berth of at least a mile. There is an anchorage 3 miles below the point in 9 fathoms water, sand and mud bottom, on the SE. side, but it is little better than on the open coast. The boat landing is bad and through a heavy surf. Vessels should not go within three-fourths of a mile of this point.

**From cape Corrientes to Chamela bay** the water is shoaler than along any other part of the coast, and vessels may anchor off any of the sand beaches. This coast is not considered safe between June and the last of November, when SE. and SW. gales are prevalent, bringing in a heavy sea.

**Rivas point.**—At the NW. entrance to Chamela bay is a bold cliff, not distinctly marked, of reddish-brown bluffs, with outlying rocks, on which the sea continually breaks.

**Chamela bay** is the first noticeable indentation of the coast to the southward and eastward of cape Corrientes, and is called Purula bay on some charts. It is a shallow bight, sheltered by a chain of islands and extending from Rivas point to Flat Top point.

**Islands.**—Two conspicuous islands occupy a central position between the headlands. The most westerly of these is Passarera, remarkable for its perpendicular white cliffs, which are seen from a long distance; the other large island, Colorado, having a reddish appearance, takes its name from its color.

The best anchorage is in the NW. part of the bay, where 6 fathoms of water is found within 500 yards of the beach, with protection from all but southerly winds. In anchoring here be governed by the size of your vessel and her draught, as there is anchorage anywhere within a line from Perula point to the north end of Passarera. Small vessels anchoring closer in, in the bight, get more out of the swell, which is heaviest during the period of full and change. Another anchorage is between Colorado island and the beach to the eastward, but it is more exposed; yet, if wishing to communicate with the village of Chamela, this is the more desirable. Small vessels anchor inside of Cocina island, in 4 or 5 fathoms, half a mile from the village. Inside of this it shoals rapidly. During the fine or dry season, from November to June, when the sea breeze from the northward and westward is regular during the day and the land breeze at night, the anchorage is perfectly safe in any part of the bay; but during the rainy season, June until November, gales from the SE. or SW. are frequent and occasion heavy seas.

**The village of Chamela**, located at the southeast end of the bay, is a port of entry, with the regular custom-house officials. A large white house, situated on a bluff, can be seen a long distance at sea, particularly with the sun past the meridian. A stream of fresh water flows into the bay just north of the village and at the base of the bluff on which the white house stands.

**Supplies** of fresh beef, chickens, eggs, fruit, &c., can be had in small quantities by giving notice in the village.

**The exports** are chiefly hides and dye-woods, the latter of an inferior quality.

**Tonnage dues** are $1 per ton.

In approaching Chamela bay two prominent mountains lying back of it form excellent landmarks, easily seen and recognized in clear weather for a long distance on either side of Chamela. The nearer one, Gueguenton, lies about 11 miles N. 73° E. from the observation spot at the head of the bay, while the other lies N. 60° E. 5 miles from Gueguenton, and is 4,675 feet high. Its appearance from either up or down the coast is about the same. Wishing to enter Chamela, bring these in range, and stand in on this course until near Passarera or Colorado islands, then go either to the east or west of the islands, according to where you desire to anchor. Just to the eastward of Chamela is a hill

in the nearest shore range 1,260 feet high, with low and yellow bluffs just under it. These, with the hill, might be used in approaching from the eastward when the mountains are shut in by haze, smoke, or rainy weather. Passarera will be the mark, under the same conditions of the weather, when coming from the westward.

**Farallon Point anchorage.**—Farallon point forms the southern part of a fairly protected anchorage in the season of southeasterly winds. The anchorage, in 10 fathoms, about one fourth of a mile from the beach, with Farallon point distant half a mile, is marked by a clear-cut bluff resembling a palisade, a few yards back from the shore near the southern end from the anchorage. The landing for boats is fair at the southeastern end of the sand beach.

**Los Frailes** are two needle rocks, 75 and 120 feet high, standing out clearly and distinctly from the land, and at times having the appearance of a sail. The inner one, with three or four low rocks about its base, shows sharper than the outer. The top is white from the deposits of sea birds. Between these two rocks there is a passage of a quarter of a mile wide with plenty of water and free from hidden dangers. Inside the inner Fraile, and about 150 yards distant, lies a small low rock, and inside of that a rock cluster and reef extending nearly to the bluffs. A vessel might pass between the inner Fraile and this reef in case of necessity, but it is not safe. There is deep water close to the outer Fraile and no hidden dangers near it. A few low rocks lie off the SE. side close to the base, but not in a dangerous position. Vessels may pass the outer Fraile within 200 yards, if necessary, without danger.

**Porpoise rock** is about 12 feet high and on a range from the outer Fraile and the inner slope of Navidad head. It can easily be seen in coming from the westward and appears to lie well out from the bluffs to the westward of Tenacatita bay. It may be passed close to in rounding into the bay, but on no account should an attempt be made to go inside of it, as there are many sunken rocks between it and the shore.

**Tenacatita bay** is a large indentation lying between Brothers point and Navidad head. This bay contains West bay, a small cove in the northwestern part, and Tamarinda bay in the eastern part. It is free from dangers with the exception of Center rock, the depth of water being regular, vessels of any size may enter with perfect safety and find a good anchorage.

The best anchorage, and one well sheltered during the rainy reason, is in the northeastern part of the bay, off Tenacatita village, in 10 fathoms of water, about a quarter of a mile from the long sand beach, towards which the water shoals gradually. This excellent anchorage is well sheltered during the rainy season. In West bay vessels of light draught will find a good anchorage in 7 or 8 fathoms sheltered from nearly all winds, but must pass to the eastward and northward of Center rock. Vessels can anchor in Tamarinda bay, where the boat landing is better than off the village, but it is not convenient for loading or discharging cargo.

**Supplies.**—Provisions cannot be obtained here without sending into the interior, and then only beef, chickens, and eggs. Water is procurable near the village and firewood and coquita nuts and shells are abundant. These shells can be used for fuel in case of necessity; 3 tons of them are about equal to 1 of coal for steaming purposes.

**Navidad head** is remarkable when seen from any direction. In one place it is divided, forming two islands separated by a narrow rocky passage through which boats may, with great caution, pass. The outer extremity is the highest point and forms the head proper, when bearing north it has the form of a wedge.

Extending out from the head in a SSW. direction are three large rocks, which are additional marks for Tenacatita as well as for Navidad bay, some 7 miles to the eastward of them.

**White rock** is often mistaken by strangers for the white islet off Manzanillo; this could only take place in the absence of a chart.

Inside the limits of Tenacatita bay, and nearly opposite the end of the island ridge forming the head, lies a group of white rocks, which show out very prominently against the dark background when approaching from the westward.

**Navidad bay**, with a sand beach at its bottom, lies between Harbor point on the west and Graham head on the east. There are two small villages at either end of the beach which are inhabited only during the dry season, the people wisely moving into the interior while the rains last. A small lagoon near the village at the western end of the bay extends to within a short distance of the beach and breaks through it during the rains; the water is not recommended for use.

Near the eastern end, another lagoon empties into the bay. There is 1½ fathoms at its mouth, through which a strong current runs, and, though the lagoon is very shallow, it is navigable for boats at all seasons; the natives say for 20 miles into the interior.

**Harbor point.**—At the western entrance of the bay is a high projecting point which, with several detached rocks, forms the shelter or protection for the anchorage with the wind from the SW.

**Anchorage.**—During the dry season this is an excellent anchorage, but it is not recommended for sailing vessels at other times, as they might have difficulty in getting out with the prevalent southerly winds. Sailing vessels might anchor further out, but there will be more swell.

**Supplies.**—Beef, chickens, eggs, and fruit can be had in small quantities from the natives by giving a few days' notice. The best oranges on the coast of Mexico are found here at the cheapest rates, and coquita nuts are abundant. In obtaining supplies here, as in all other places in Mexico, deal with the natives.

**Graham head**, in common with all others on this coast, appears as an island when first sighted at a distance. A rock 10 feet high lies two-fifths of a mile from the nearest point of the beach under Graham head. Vessels passing this point should give it a berth of at least three-

quarters of a mile. There are no known dangers outside the low rock mentioned above.

**Piedra Blanca**, or White island, the principal land-mark for Manzanilloa bay, lies 1 mile S. 45° W. from the junction of the sand beach and bluffs. It is nearly circular in shape and about a quarter of a mile in diameter, but is irregular in outline and height. The highest point is on the south side, with all its faces precipitous. From the deposits of sea birds the island is very white in appearance and is readily distinguished at a great distance. There is plenty of water close up to it on all sides, and vessels can pass between it and the beach or the group of rocks off the bluffs. These rocks, about 5 feet high, lie half a mile west of the bluff, and only about a fifth of a mile off the beach.

**Manzanilla, Santiago, and adjacent bays.**—Between Punta Carrizal on the west, and Punta Campos and Sail rock on the east, are the bays of Carrizal, Higeras, Santiago, and Manzanilla. The largest and most important, Santiago and Manzanilla, are only separated by a small narrow projection of the coast called Punta de Santiago.

In standing in for Manzanilla you have the following excellent landmarks, viz, Piedra Blanca (White island) and Cerro Juluapan (Table mountain), with Wreck cone on the west; and Vigia Grande with its projecting peninsula, and Sail rock off of it on the east of the entrance of the bay.

**Vigia Grande.**—From the westward this peninsula looks as if there was a cut through the middle. This is called "Las Ventanas," and is not visible from the eastward when close in to the beach.

**Vigia Chica** is the lookout station for Manzillo.

**Sail rock** is so called from its appearance when seen at a distance, has deep water outside and close to it, with no dangers except those shown on the charts. A vessel can pass between the point and this rock, but it is not recommended to do so.

Vessels bound in or out can pass within a quarter of a mile of all the bluffs from Sail rock to the anchorage, the sunken and detached rocks being indicated on the larger charts.

Capt. W. H. Parker says: "In making Manzanillo from the westward, it is better to get hold of 'Frailes' then Navidad head, Graham head, and White island, passing about 1 mile from these points. The only outlying danger is the Sister rocks (Los Frailes). If very dark or thick, you can easily make sure of avoiding this rock by keeping over toward the starboard shore; run 5 miles from the White island, then haul up; bring the Sugar Loaf (Vigia Chica) on your starboard bow; as you pass this close to you will open the lights of the town. Should there be no light on the buoy, you will find it by steering about S. 74° E., directly for a high peak with which the buoy is in line.

"Bound into Manzanillo from the eastward you should pass point Tejupan at a distance of 2 miles, and verify your position by taking the

time when Black head is abeam. You have then but 42 miles to run to Manzanilla point, and there is nothing to excuse your running by the harbor. Manzanilla point is a bluff headland, and you will be sure to see it, if you keep *close enough* to the shore. Sail rock will make out to the left of the point, unless you are set off, in which case it will be *on* with the point and cannot be seen. Pass one-third of a mile from the rock and point, and follow the land round with a port-helm to your buoy. It is all a bold shore."

**Anchorage.**—The anchorage is immediately under Vigia Grande, about a quarter of a mile from the village beach, in 9 fathoms of water. It was considered safe with all winds, except gales from the southward and westward, but in October, 1881, Manzanillo was visited by a terrific hurricane, commencing at E. and SE. and veering to the S. and SW. When in the eastern quarter it tore off the roofs of all the houses, uprooted trees, and drove ashore every vessel in the harbor. During the dry season the bay is safe; but this is the most unhealthy season of the year. Fever and ague prevail at all times, but are more fatal during the dry season. It is recommended not to lie here more than three or four days at a time, and to take an off-shore berth in 15 fathoms, where you can get the full benefit of the sea breeze during the day and lessen the stench from the lagoon at night. Allow the crew or officers to land or be exposed in boats as little as possible, and under no circumstances take water on board from Manzanillo. If water must be had get it from Santiago.

**Manzanillo,** a town of about 1,000 or 1,500 inhabitants, is of importance only as the seaport of Colima, and as the terminus of the Manzanillo and Laredo railroad, is growing in size and importance. It imports coal, machinery, dry goods, &c., and exports cedar, brazil-wood, indigo, coffee, &c.

**Port charges.**—Tonnage dues, $1 per ton; pilotage, $3.50 per foot, but not compulsory; bill of health, $4. There are no wharves, vessels loading from or discharging into lighters, but the railroad company propose building such one that vessels can lie alongside and load or discharge their cargoes.

**Steamers.**—The Pacific Mail Company's steamers call here once a month.

Behind Manzanillo there is a large stagnant lagoon filled with dead and dying vegetable matter, which renders this locality unhealthy and malarious, and the stench (bilge water) is almost unbearable at night, carried out beyond the 15-fathom anchorage by the land breeze.

The United States is represented by a consul, vice-consul, and deputy consul.

**Supplies** of beef and vegetables, as well as other necessaries can be had here, but as before mentioned fresh water should on no account be received on board.

**Colima.**—From Manzanillo N. 72° E. and 35 nautical miles distant is Colima, the principal city and capital of the State of the same name, with a population of about 40,000.

It is handsomely built, and like Sacatula on the coast was founded by Cortez. The climate in this valley is very hot; the soil, however, is very productive. The vegetation consists of palms, aloes, and superb orange trees; and above the usual level these tropical plants are replaced by forests of somber pines.

**Volcano of Colima.**—N. 21° E. and 17½ miles distant from the city lies the volcano of Colima, which also bears N. 55° E. 48 nautical miles from Manzanillo, and is the western extremity of the volcanic chain which traverses Mexico from east to west. Little is known of the volcano beyond the few facts obtained by Don Manuel Abad, Vicar of the Bishopric of Michoacan, and while it frequently throws out smoke and ashes, no violent eruption has taken place for a very long period.

**Safa volcano.**—About 3½ miles north of the volcano of Colima there is the extinct crater of Volcano de Safa. Its summit is usually covered with snow and it, with the volcano of Colima, may be seen from a great distance at sea, and offers, when the atmosphere is clear, an excellent landmark for navigators approaching Manzanillo

**From Punta Campos to Black head** the shore line is a gray sand beach, upon which the sea breaks heavily. Anchorage can be had anywhere off the beach, except directly in front of mouth of the Cayutlan lagoon, whence extending directly out to sea there appears to be a submarine valley, as will be noticed by inspecting the soundings on the chart.

**Cayutlan lagoon,** separated from the sea by a narrow strip of low land on which runs the railroad from Manzanillo, extends for 18 miles inside and parallel to the shore line.

**River Pascuales.**—About 5 miles N. 18° W. from Black head, and marked by a line of breakers extending out about half a mile from it, is the mouth of the river Pascuales. A hut stands on its east bank. Vessels sometimes load here with dye-woods.

**Black head** juts out from the mainland and has the appearance of an island when first seen from the westward or eastward. It is a rocky peninsula, densely wooded from base to top, and connected with the higher wooded hills on the mainland by a low sandy neck of land half a mile wide. A small white rock 75 feet high lies one-fifth of a mile from the northwestern side of the head. An excellent enchorage in 10 fathoms may be found one-quarter to half a mile inside of this rock and about half a mile from the beach. Boats can land on the beach, but there is nothing to be found here. Vessels can pass within one-quarter of a mile of Black head, deep water being found close up to it.

Midway between Black head and Tejupan point a remarkable table topped mountain forms an excellent landmark. Three-fourths of a mile east of the river begins a line of low white rocks 5 to 12 feet high and ex-

tending nearly 2 miles. Two miles west of Tejupan point a dangerous shoal and reef makes out from the shore more than a mile, its locality being marked at most times by the breakers on it. A line from Black head to Tejupan point barely clears the reef, and vessels from the westward standing into an anchorage under Tejupan should be particular not to get inside of the line. Between the inshore end of the reef and Tejupan point there is a line of low bluffs separated from each other by small sand beaches.

**Tejupan and San Telmo points**, from either the westward or eastward, look like one projecting point; from the westward Tejupan apparently projects most; from the eastward San Telmo seems farthest out, and when directly abreast of them there is no point visible, both being in appearance a series of rocky bluffs. Tejupan is the most prominent of the two, owing to the three rocky islets that lie S. 79° W. for three-fifths of a mile. Each one is surrounded by sunken and detached rocks, which renders landing difficult and a near approach dangerous. There is an anchorage to the NW. of these rocks in 12 or 15 fathoms of water, with a low stone pile on the middle islet bearing S. 45° E.; there being but little shelter from the southeasterly winds, this anchorage is not a good one.

**Caution.**—During the day-time Tejupan point can be passed close to, but at night a good berth should be given it on account of its lowness and the variable current setting along this part of the coast.

**San Telmo.**—There is nothing remarkable about San Telmo point. The same caution that was given for passing Tejupan at night applies here, but during the day vessels may pass close to the rocks and bluffs.

**Piedra Blanca**, lying only a few yards off the south side of the bluff, is a white rock 110 feet high and about one-fourth of a mile in circumference, and, taken together with the white bluffs back of it on the shore, forms the best landmark for Maruata bay.

**Maruata bay** is exposed to all winds except those from the northward and westward. On the west side is a white sand beach extending from the islets on the west to the bluffs on the eastern side of the bay. The anchorage is in 7 fathoms of water, sand over mud bottom, with the easternmost of the four isles bearing N. 76° W., and about three-tenths of a mile from the beach. A native hut stands in a grove of cocoa-nut palms back from the main sand beach. Although boats can land on the western end of the beach, it is better to pass outside and to the southward of the islets and land on the short sand beach to the westward of them, where the water, being out of the heavy swell which sets into the bay, is moderately smooth.

**Supplies.**—Vessels sometimes load here with dye-woods, but no supplies of any kind can be obtained. Water can be had from the lagoon which empties into the western end of the bay, but it should not be taken on board except in case of necessity. The Mexican government has tried three times "to open" Maruata to trade by establishing a cus-

tom-house here, but each set of officials having died of the local fevers and diseases, &c., the attempt has been abandoned; it is without doubt the most unhealthy place on this coast.

**Paps of Tejupan.**—These should be called the Paps of Maruatu, being nearer to that place than to Tejupan point. They are at the summit of a range and not well defined "Paps." From a vessel to the eastward or westward of them a double-nipple summit appears, the northernmost one being wooded to the top, while the other is almost bare. They are not distinctly seen from the southward as they are then overshadowed by the more lofty ranges back of them, which rise to an elevation of 9,000 feet above the sea. A smooth wooded cone 2,140 feet high is remarkable when passing this part of the coast.

**Coast.**—The whole country between Maruata and Lizard point, which is broken, mountainous, and densely wooded, rises in successive ranges until an elevation of over 9,000 feet is reached 15 or 20 miles inshore. About 5 miles to the westward of Pichilinquillo are two small sand beaches between the bluffs where fresh-water streams empty into the sea.

**Pichilinquillo bay** lies to the westward of Lizard point, with a white sand beach at the bottom. It is open to all southerly winds, yet it affords good anchorage for small coasters. Large vessels can anchor in 9 or 10 fathoms, sand bottom, on a line from the islet to Lizard point: smaller ones can go into 5 or 6 fathoms one-fourth mile from the sand beach and find better shelter. Nothing in the way of supplies is found here; in fact there are no signs of habitation anywhere near the bay. Three-quarters of a mile from the western side of the bay and on a line with Lizard point lies a black islet 100 feet high and about one-half mile in circumference. It is not easily distinguished as an island unless close into the coast.

Between this island and the sand beach inside of it are a great many sunken rocks, through which it would be difficult for a boat to pass. There are also two sunken rocks on a line between it and the bluff point on the west; one about half way, and the other close to the point.

**Lizard point**, which forms the eastern side of Pichilinquillo bay, appears from either up or down the coast as low, narrow, and projecting, buti n reality it is a dark bluff headland, $1\frac{1}{10}$ miles long on its sea face and about 150 feet high, covered with thick woods.

**Bufedero.**—Three miles west of this point there is a reddish bluff with a "bufedero" in it, which sends up a jet of water or spray, forced by the sea through the crevice of the rock below, that resembles the spouting of a whale.

Along this coast are frequent high-water breaks, indicating mouths of streams during the rainy season. There are many detached rocks off these little bluffs, but they are close to the beach, and may be approached to within half a mile without danger. The country back of this coast is rough and mountainous.

**Mangrove point** is called a bluff on some of the old charts, but it is a low round point formed by the change in direction of the shoreline. It is covered with mangroves and palms, and near the point with dead trees and brush. There is nothing to mark this locality, as the country back of it is low and flat, forming the delta of the Sacatula river.

**Sacatula point**, a double or rounding pointis, formed by Mangrove and Sacatula points, distant from each other 3 miles N. 68° E. Sacatula point is near the principal mouth of the river of the same name, and is the northeastern projection of the delta, while Mangrove point is the southern.

**Sacatula river** is a large stream which rises in the mountains near the city of Mexico, and empties into the sea near Mangrove point through three mouths, the first and largest being near Sacatula point, the second 6 miles west, and the third 8 miles west of Mangrove point. This river is known to the natives under three different names, viz, Sacatula, near its mouth or in the delta; Balza, from the head of the delta for some distance inland, and the Mescal thence to its headwaters. Instead of being "very small," as was supposed by Captain Richards, R. N., it is one of the longest and largest rivers in Mexico. During the rainy season an immense volume of water is discharged into the sea, discoloring the surface some 8 or 10 miles off shore.

The soundings off this particular part of the coast, that is, off the delta of the Sacatula, are very irregular and extend 5 miles off shore; the bottom is of shifting sand and discharged mud.

Vessels can anchor anywhere off this beach, the deep water being to the westward of Mangrove point.

**Petacalco bay.**—In this bay, as to the southward and eastward of it, the bottom is very uneven and lumpy. Vessels should approach the shore with great caution, as the bottom is shifting and the soundings on the chart, close in, are not reliable for any length of time.

**Canuta.**—There is an excellent boat landing at this place, but nothing in the way of supplies can be obtained.

**Istapa anchorage**, an excellent harbor of refuge, is formed by Isla Grande and the mainland and protected from all winds except those between WSW. and WNW., from which direction the wind seldom or never blows. About a mile to the northward of the bay is the Rincon, which, like Sacatula and most other rivers in Mexico, is closed by a bar with heavy breakers on it; but boats can cross this bar without much danger by selecting a smooth time. A small Indian village lies about 5 miles up the river, where an excellent quality of fresh beef can be had, but no other supplies.

**A sunken rock** is in the bay and about half a mile from Isla Grande, bearing N. 17° W. with only 5 feet of water on it at low water; with a heavy swell and at low water it breaks, but at other times it does not show. By keeping close to the rock off Isla Grande, say 400 yards, this

danger may be easily avoided; then stand into the anchorage, being governed by the draught of the vessel and the lead-line.

Anchor anywhere after passing a line from the rock to the Rincon river, but the deepest water is near Isla Grande. There is a free passage between Isla Grande and the mainland, all dangers showing above water.

**Isla Grande** is a small island, thickly covered with brush and undergrowth. When seen from the offing it has *not* the appearance of an island, but looks more like a headland on the mainland.

Between Isla Grande and Istapa point is an open bay, where vessels could anchor in 6 fathoms, sand bottom, but it is not as good an anchorage as Istapa.

**San Juan de Dios bay** is to the eastward of Istapa peninsula, but it is foul, being cut up by a group of rocks or islets called Islas Blancas. They are very conspicuous from the offing, particularly when the sun is passed the meridian. When seen with the sun shining on them they have a white appearance, but at other times, or on an "overcast" day, the name "blancas" is a misnomer, as they are dark brown in color, Vessels can pass within a quarter of a mile of them in safety.

**Sihuatanejo** is a small but excellent harbor, free from all dangers and easy of access, with deep water close to the rocks on either side of the entrance. The harbor is open to all winds from the southwest, but you can anchor anywhere inside the bay, making allowance for the draught of the vessel and the heavy swell that sets in from the sea. The holding ground is good, the bottom is soft mud. The land all around it, except at the head of the bay, rises abruptly from the beach, the bluffs bearing NW. and SE. from each other, those on the east side being the higher.

**Supplies.**—Excellent beef and water can be obtained here, but no other supplies.

**Black rock** is off the entrance to the harbor, and is the only good mark to the entrance of the bay. Between the rock and the entrance to the harbor the bottom is gravel and stone. Directly back of the harbor there are two remarkable peaks, one about 2,000 feet and the other about 2,500 feet high. As you near Black rock the sand beach to the right and in the harbor can be seen, but the huts at the head of the bay do not show until quite well in.

Remember that *Black rock is the mark* for this harbor, and without getting hold of it there may be trouble in finding Sihuatanejo, while with it close aboard one cannot miss or mistake the entrance.

**Morro de Petatlan** is a round hill jutting out into the sea, and is densely covered with bushes and straggling trees. The Morro at a distance, either east or west, appears like an island. It is connected with the mainland by a narrow neck of land thickly covered with undergrowth. Around the point to the northward and westward is the bay or roads of Petatlan, affording anywhere an excellent anchorage with shelter from all winds except those from the SW. to NW., ac-

cording to the draught of the vessels, 9 and 10 fathoms just inside the point, hard sand bottom, shoaling gradually to the beach. On the north side of the Morro is a straight and abrupt shingle beach; at the end of the shingle, and the commencement of the sand beach, there is an excellent boat landing. There is an abundance of very good edible fish in the lagoon, but there are no supplies to be had, nor is there any fresh water in this vicinity.

**La Punta Japutica**, low, black and rocky, is easily recognized, as it is the only rocky projection on this immediate coast. To the northward and westward of Japutica the coast recedes a little and vessels may anchor here. About a mile east of Japutica point there is a remarkable sand patch, 300 yards back from the beach and extending up the bank 75 to 100 feet; it is bright, clear, free sand, surrounded by bushes, and a little to the eastward of it is a large cocoanut grove.

**Punta Gorda** is the extreme west point of this headland. To the northward and westward of Papanoa or Tequepa is Tequepa bay, which has excellent shelter from all winds except those between SW. and NW. A good boat landing is found at the head of the bay, but neither water nor supplies of any kind can be obtained.

**Coyuquilla river** is about 3½ miles N. 15° W. from Tequepa and to the westward of Animas rock. The small stream 9 miles east of Tequepa is the San Luis river, which breaks through the beach only during the rainy season. The land back of Tequepa is very high and thickly wooded.

**Paps of Coyuca** is a remarkable double-coned mountain, in lat. 17° 23′ N., long. 100° 05′ 30″ W. These cones or "paps" lie in a northwest and southwest direction from each other, their summits or apexes being separated by only about a mile in a horizontal line. The northwestern is 10,590 feet high, and the other, or southeastern, only 10,470, while the height of the cones or paps above the mounter proper is about 1,200 or 1,500 feet, the northern being the higher. Owing to the height of this mountain clouds settle over it, and the paps are seldom seen, particularly near and during the rainy season. During this time all of these high ranges are covered with clouds; early in the morning they are clearest.

From the light-house on Grifon island the paps bear N. 23° W. distant 35 miles, and from Tequepa point they bear about N. 83° E. distant 56 miles. To the northward and westward of the paps, and nearly 30 miles from the beach, is a remarkably high range of mountains, some of which have an elevation of 12,000 feet.

Between Tequepa and the heads of Acapulco a vessel can approach the beach to within one-third of a mile, and anchor anywhere in from 10 to 15 fathoms of water about one-half of a mile from the line of breakers, just outside of which is 6 fathoms of water. Boat landing is almost impossible on this beach, as there is always a very heavy surf.

**The heads of Acapulco** are the only rocky projections breaking the sand beach from Tequepa point on the west, to Acamama point on the east, a total distance of nearly 140 miles. In making Acapulco from the SW. or S. the entrance is remarkable from the yellowish cliff of Diamante point and Roqueta island, which can be seen at a long distance; the paps of Coyuca are also seen, but the eastern peak appears cut off. There is also a white wooden tower on the summit of Roqueta island used for a light-house. There can be no difficulty in making the harbor, as it is further pointed out by a lofty promontory, which maintains its height and abruptness to the sea. This high land is covered with trees and shrubs and everywhere presents a green surface, except where it meets the sea its face is laid bare, and shows only white and gray cliffs of granite, not of a massive character, but splintered in all directions.

**Acapulco.**—This harbor is considered the finest in Central America or Mexico, and, for its size, one of the most complete in the world. The bottom is sand, but clay beneath, and affords good holding ground.

All around the harbor are high mountains, which afford considerable shelter to the harbor, and may be seen at a great distance at sea.

**Port Marques**—Between Bruja and Diamante points, just outside the entrance, is the little bay of this name, with mud, sand, and rock bottom, where there is good shelter from all winds, except westerly, which blow directly into it.

**Boca Grande.**—A vessel entering Acapulco can use the Obispo rocks as a mark to lead in through mid-channel until nearly abreast of Grifo point; then haul up for anchorage. As there is deep water close to the rocks near this point, and no outlying rocks, a vessel can pass very close to Grifo.

**Serieuse shoal.**—There are no dangers in Acapulo harbor except this shoal or rock in the northern part of the bay. It is 1,100 yards N. 79° E. from the fort, and has 15 feet of water on it. It was discovered by the French ship Sérieuse striking on it, and lies on a line between fort San Diego and the Obispo rock.

**Anchorage.**—The best anchorage is in Sta. Lucia bay, in front of the town. By anchoring in about 10 or 11 fathoms of water, and with fort San Diego bearing N. 11° E., distant one-half mile, the vessel will be abreast of the low land called the Manzanilla, between the bay and the sea to the westward, and thus secure the benefit of the sea breeze, which blows across this neck of land. The sea breeze blows quite fresh from about 11 a. m. until after sunset. The land breeze comes from the northward and eastward during the night, but it is always very feeble, and dies out about sunrise.

The advantages of this berth may be further increased by running out a hawser to the rocks just north of the anchorage and bringing the ship broadside to the wind. There is a mooring ring in the largest of these rocks.

The town is situated on the low ground at the northwest end of the harbor, is poorly built, only a few of the houses having more than one story. There is one large church, a fair market-house, and a small plaza or garden near the center of the town.

It has a population of about 4,500, mostly of mixed blood, the Indian and negro races predominating. There are a few Europeans, who carry on most of the exporting and importing trade of the place.

Acapulco was at one time subject to severe earthquakes, but of late years they have been few and not very destructive. The rainy season, also a great drawback to the prosperity of the town, and very severe, commences about the end of June and lasts until the end of October. Owing to the immediate vicinity of a lofty chain of mountains that overlook the town the fall is heavy and almost incessant. During this period the inhabitants are compelled to use every precaution to keep their houses dry, particularly the floors; a neglect of this is supposed to produce fever.

During part of the dry season the air is filled with a putrid affluvia from a morass to the eastward of the town. This, together with the heat of the sun's rays on the granite rocks which environ the town, renders it very especially unhealthy to Europeans. A cut has been made in the rocks to the westward of the town to let in the sea breeze, which has tended to improve its salubrity. The heat during the latter part of the dry season becomes intense, the thermometer rarely falling below 98° F.; water becomes scarce and the streams running dry; it is then necessary to depend upon wells for water; this is not always good. There is no system of underground sewerage, but of late the town has been kept quite clean by sweeping the streets and attending more carefully to the police of the town. Acapulco rarely escapes a visit of pernicious fever once a year; this usually comes during the latter part of the rainy season.

**Supplies.**—The market is well supplied with fresh provisions, and fruit is excellent and abundant. No naval stores of any kind can be obtained. Fresh water of a good quality is found at several points between the fort and Obispo rock, but the best streams are between the fort and San Lorenzo. Ships can now be supplied with water from a water-boat fitted for the purpose; this water is taken from a well in the town, and is of fairly good quality.

**The custom-house** is at the water's edge, near the short sand beach in front of the town, where all imports other than coal must be landed. The captain of the port visits all vessels entering the harbor, and has control of all loading and unloading. Nobody is allowed to work in boats, lighters, or vessels except the men of the *Matricula* of the port, under the immediate command of the captain of the port. A vessel having 1,800 tons of coal discharged it in thirty days.

Tonnage on foreign vessels, $1 for each cubic meter (about 35 cubic feet English measurement). Use of hoisting engine, 25 cents per ton.

Bill of health, $4. Harbor fees, $6.50. Water, per gallon, 1 cent f. o. b. Ballast, f. o. b., $1.75 per ton. Steamers as well as sailing vessels bringing coal are exempt from the payment of tonnage fees.

There is telegraphic communication to all points.

The mail leaves every other day for the interior and the City of Mexico. The Pacific Mail Steamship Company's steamers call here to take coal and exchange freight with the coastwise steamers of the same line four times every month, twice going and twice coming. They take the mails for Panama, San Francisco, and intermediate ports.

**Coal** of good quality can always be obtained. One of the merchants has a contract with the British Government to keep constantly on hand at least 500 tons of Cardiff coal.

**Marine railway, repairs., &c.**—The Mexican Government has commenced building a marine railway for the purpose of making repairs to vessels not exceeding 800 tons, at Ycacos, a small indentation of the shore to the eastward of Guittaron point.

The Pacific Mail Steamship Company maintains a small machine shop, where slight repairs, but no work of an extensive nature, can be done.

**Pilots.**—All vessels are signaled from the Vegia to the port, and pilots will go out to bring in vessels, but none cruise off the harbor. Pilotage, $3.50 per foot draught inward and outward, but only paid when the service is rendered.

**Lights.**—There is a white light on the white wooden tower on Roquet island, operated by the Pacific Mail Steamship Company, and lighted only when one of their steamers is expected or about leaving the port. This light is visible in clear weather about 20 miles.

**Population**, 5,000.

**Imports**, manufactured goods and coal.

**Exports**, hides, wool, cotton, indigo, cochineal, cedar logs, fruit, &c.

The United States is represented by a consul and vice-consul.

Leaving Acapulco bound east, after psssing the Potrero or Rodrigues rock the rocky coast breaks away for half a mile or upwards, where it joins the sand beach. This beach continues uninterrupted (except where lagoons break through during the rainy season) for nearly 60 miles, to the rocky point of Acamama or the Cerro del Coacoyul.

**Caution.**—About 15 miles from the Potrero is a low sandy point covered with green bushes with very heavy breakers off it. Owing to a current setting S. 79° E. off the heads of Acapulco and some distance east at from a half to two knots, therefore in leaving Acapulco bound to the southward and eastward, this fact, and that the current sets strong to the eastward, should be remembered, and if at night or thick and and rainy do not steer higher than S. 56° E. until well clear of tne point. This sandy point is extending year by year. The lagoon and river just east of it makes a great deposit, that, with the wash of the sea, causes the point and shoal to grow.

During three seasons of surveying, Commander J. W. Philip noticed a change in the astronomical bearing of the outer breaker from the light-house.

**Papagayo lagoon or river** is east of this sandy projection, with a bar across its mouth. During the rainy season and for a time after until the neighboring country is drained, this lagoon breaks through the beach and its discharge discolors the sea for miles off the coast, and is a good mark for the entrance to Acapulco, especially if you are close in shore and are without observations. Off this sandy point (west of the mouth of the lagoon), although there is a very heavy surf and breakers extend some distance out, the beach can be approached within a mile if necessary.

About 20 miles from the mouth of this lagoon the remarkable Corcovado peak, mentioned by Captain Parker, makes an excellent mark (when not obscured) for vessels from the east bound to Acapulco.

**Nexpa village.**—Twenty-two miles from this same lagoon is a small collection of huts on the beach called the village of Nexpa, which, though small, is the largest along this coast. Just east of the village is the Boca del Rio de Nexpa.

Along this entire beach, which is low and sandy and crowned with low bushes interspersed with palms and cocoanut trees, a heavy surf breaks and there is no boat landing. Inland the country which is low and cultivated to the foot-hills, rises to hills and mountain ranges from 1,200 to nearly 6,000 feet high.

**Acamama point**, low and rocky, with two or three detached rocks to the westward of it, ends the sand beach from Acapulco. There is a heavy line of breakers extending in a SE. direction for upwards of a mile off this point. In the extreme edge, or end of the break, 4 and 6 fathoms of water was found during the survey of this part of the coast by the U. S. S. Tuscarora. The surf breaks so heavily that the steam cutters could not go in to ascertain the depth, or whether it was rocks or a shoal that caused the breakers.

**Soundings and anchorage.**—Between Potrero and Acamama points anchorage can be had anywhere along the beach in 10 to 15 fathoms bottom, sand on top and good holding ground.

**The Dulce river**, on the bank of which lies the village of Tacoanpa, discharges large volumes of mud and water during the rainy season which forms a shifting bottom off its mouth, consequently soundings are irregular and changeable; a shifting bar across the mouth can only be crossed by boats or lighters at certain stages of tide and swell. There is 6 feet of water at low tide; rise and fall about 7 feet.

**Supplies.**—There is excellent hunting and fishing up the Dulce, which can be ascended 15 or 18 miles, using ships' boats, or in canoes obtained at Tacoanpa. Beef of a fair quality can be had, and water obtained well up the river; owing to the bar it will be difficult to raft it off. At the full and change of the moon there is always a heavy

swell setting in from the SW., cutting off all communication with the river and village.

**Tartar shoals**, the least known and greatest danger to navigation on this portion of the coast, lie off Maldonado point, or, better named by the native coasters, Punta Escondido; this point cannot be made out from the westward, unless inside of N. 68° W., and in coming from the eastward disappears after passing the bearing N. 23° W.

Within these limits are several shoal patches with rock, which constitute the dangers to navigation. This danger has been incorrectly reported on various bearings and at distances of from 4 to 13 miles off shore.

To the westward of the 5-fathom shoals the depth is irregular, being from 6 to 11 fathoms, but outside of 3 miles the depth increases gradually to 40 fathoms in a S. 79° W. direction, and 100 fathoms in a southerly direction.

At a distance of $1\frac{4}{10}$ (1.4) miles N. 70° W. from the point is the wreck of the steamer City of San Francisco, on a shoal that is gradually growing by the action of the sea on the bottom. Heavy breakers extend one-third of a mile outside of the wreck on a line with it and the point.

**Punta Escondido** is a tolerably well defined point and is seen only when close in to the beach. There is a small bight close around the point to the westward, where there is a good boat landing; and 1 mile from the landing to the northward and westward is an abundance of fresh water.

To the westward of this point is a sandy beach, and for a distance of 6 miles is a series of sand bluffs from 200 to 300 feet high, with ravines between them, which are good landmarks at certain seasons.

To the eastward, for a distance of 2 miles, the cost is rocky, with 2 small breaks where there is a sandy beach; and within a distance of 1 mile from the point are several sand cliffs about 250 feet high, which are prominent and show white from the southward. The entire country in the vicinity of the point is from 300 to 400 feet high and thickly wooded.

At the close of the dry season the forest fires, which everywhere prevail, produce so much smoke as to obscure all the higher land, and also that near the coast, except when close to, so that one not familiar with the country would greatly overestimate his distance, and owing to the peculiar lay of the land in regard to the "rising sun" a shadow is cast beyond the beach line of breakers, making the beach appear much farther than it really is. Navigators passing or approaching this portion of the coast should bear this in mind. It would also be prudent to keep the lead going and keep outside of 20 or 30 fathoms.

**The current** sets S. 78° E. to S. 22° E. It varies from ½ to 2 knots per hour, and is strongest on the ebb tide S. 78° E. Close in to the point the flood sets to the northward and westward.

About 6 miles SW. of the point very heavy "tide-rips" were observed; the water would curl up to the point of breaking. The U. S. S.

Tuscarora sounded through, in, and around it, but the least water ever found was 18 fathoms.

The white cliffs or bluffs, which are the only ones along this coast, lie back of Tartar shoal, are the principal marks for it.

Passing Maldonado at a distance of 7 or 8 miles from the land, no point, bight, or hook can possibly be distinguished. The whole coast appears as one beach or line, but close in (inside or near Tartar shoal) the two points of Maldonado can easily be made out. A ship, for safety, should never be that close to the shore.

When well outside of the shoals, say 6 or 8 miles, a second range of hills will show above the shore range or beach bluffs. If, however, the back range is not visible (the weather being clear) the ship is too near the shoals for safety. As it is impossible, too, during the "smoky time," to distinguish objects on the land at a distance of 5 miles, navigators should always shape their course so as to pass Maldonado point at a distance of not less than 8 miles.

**Anchorage** may be had to the northward and westward of Tartar shoal in 6 or 8 fathoms; sandy bottom anywhere along the sand beach. The best is nearer the wreck and Escondido than farther up—that is, if you intend to land with your boats.

**Coast.**—From "El Recodo" or the bluffs of Maldonado there is a white sand beach for 49 miles to the mouth or bar of the Rio Verde. This long sand beach, which is steep-to and surmounted by palms and low bushes, is broken only twice by low rocky bluffs.

Just east and back of the Maldonado bluffs there is an extensive low plain, well cultivated for this part of Mexico, with a few villages on it and a large lagoon near the beach. N. 34° E. of Maldonado, and 24 miles from the coast, there is quite a remarkable fort or castle-like mountain, with a cone-shaped turret at each end of the ridge, which makes an excellent mark for Tartar shoals if coming from the eastward in clear weather. During the months of April, May, June, and the first part of July, the atmosphere is so smoky and hazy at times that it is impossible to see and distinguish objects 2 miles from the beach.

**Anchorage** may be had off the beach to the eastward of the bluff in 7 to 10 fathoms; the bottom is of coral and rock and uneven.

Five miles N. 77° W. of the Rio Verde are two or three rock bluffs, and 1½ miles N. 77° W. of these bluffs there is a reef of rocks one-fifth of a mile off shore. These rocks are, two or three in number, from 10 to 15 feet high, and can be seen only when close in; the water is deep and free just outside of them.

Coming from eastward or westward, the land at the Rio Verde appears as a low, sandy point covered with trees, 1 or 2 miles long, with heavy breakers off it.

**The Rio Verde**, the largest river on this part of the coast, is about 50 miles to the eastward of Tartar shoals. It runs to and beyond Oaxaca and, like the Sacatula, after draining a large extent of country, de-

posits an immense amount of débris at its mouth. It is supposed that the low land at its mouth is gradually extending or growing out into the sea, and that the river causes the shoal water to the westward, as well as the holes and deep pits outside. During and after the rains the water is discolored for a long distance off shore. Its mouth is closed by a bar, which has very little water on it, and on which at a distance of three-quarters of a mile from the beach the sea breaks heavily. The breakers extend in a horseshoe shape from beach to beach, with deep water close to the outer curl. The natives give information, and their statement is confirmed by the Jefe Politico of Tutupec, that there are several rocks directly in the line of breakers. It is impossible to enter the river with boat or canoe, and the natives even never attempt it.

**Galera or the Little Morro** is a bold, barren, and isolated rocky bluff or headland, of a grayish color, with several detached rocks off its eastern end, and connected with the mainland by a low narrow strip of land. When first seen, in approaching it from the westward or eastward, it appears as an island well out from the coast line. Coming from the westward in shore Galera appears as an island, with Merro Hermoso to the northward of it and over the Verde point.

To the northward and eastward of the Galera is the outlet to the Chacahua lagoon, with a sand bar across it, and a depth of 4 feet during the rainy season, but at other times it is dry all the way across, and the surf breaks heavily upon it. When the bar is open a boat can enter the lagoon by "by watching for a smooth time" with no greater inconvenience than filling.

**Chacahua lagoon** extends from the Galera to the base of the Morro Hermoso and some distance inland; its waters are fresh, but highly impregnated with sulphur, and even were its waters sweet a supply could not be obtained owing to the difficulty in crossing the bar. The lagoon has a depth of from 12 to 15 feet during the rainy season, but this is reduced about 4 feet during the dry season. Just back of the Galera, native sulphur in small particles crop out on the surface of the hill, and metal implements change color in a few minutes when immersed in the waters of the lagoon.

**Tututepec** is about 10 miles N. by E. from the Galera. It is an Indian village of 2,000 or 3,000 inhabitants, governed by a Jefe Politico. This village is situated on a spur of the foot-hills about 900 feet above the sea and can be well seen from the offing when the sun shines upon it; the church shows as a white spot on the hill-side.

Between Tututepec and the coast there is an extensive plain plentifully watered by clear and running streams and well adapted to the growing of sugar-cane and cotton.

**Supplies.**—Beef, fowls, eggs, fruit, &c., can be obtained by sending for them to the village.

To the northward of Galera and around Tututepec the hills are brown and barren, having a spotted appearance from the offing, whilst elsewhere they are densely wooded.

**Chacahua Bay anchorage.**—There is a good anchorage anywhere in the bay, but the best is between the reef of rocks (above the water) and the sand beach to the northward. Back of the bay the beach rises to a ridge which is covered with a dense undergrowth and stunted trees.

**Morro Hermoso**, a rounded bluff or headland, looks like an island when coming from the eastward or westward. On its south face it is quite steep, bare, of a reddish color, and without any vegetation, but on its inshore side and to the middle of the top it is covered with heavy undergrowth and thick timber. A vessel can pass within a mile, as all known rocks and dangers show themselves above the water and are close to the rocky shore.

**Rio Grande.**—Off the mouth of this river, which is closed except during the rainy season, the water is shoal and extends to Morro Hermoso.

**The Escondido bluffs** are the only ones of any size from Morro Hermoso to those westward and back of White rock, near port Angeles. The extreme western bluff is a low flat point of a decided red color. There is a bright yellow spot about midway in the Escondido bluffs, which can be seen a long way to the westward.

**Escondido bay** is an excellent anchorage with good holding ground. Bring the rocks Piedra de la Marina, in the northeastern part of the bay, to bear about N. 11° E. and anchor in 10 or 12 fathoms of water on this bearing.

**Supplies.**—Beef, fowl, eggs, fruit, &c., can be obtained here, but no fresh water.

**The Cerro de la Ocote**, with the high bluff, is the best mark for finding the bay. The lead will guide you in and to the anchorage.

**San Pedro de Mistepec** is about 9 miles north of Escondido bay, and like Tututepec and other small inland towns, is governed by a Jefe Politico.

**Road to Oaxaca.**—There is an excellent road from Escondido to the city of Oaxaca, and, judging from information received from the natives, the road is better and shorter than that from port Angeles to the same place; these two roads join some leagues from the coast.

**Sicatela river**, just west of Sicatela point, is a large and important stream for Mexico, but like nearly all these rivers, its mouth is closed with a sand bar, over which a boat cannot pass.

**The point of Rocks** is a low point with several small detached rocks off it; the water is shoal, the bottom rocky, and heavy breakers extend some distance out from the shore. For upwards of 5 miles along here there are several rocks and bluffs on the beach, with very foul bottom off them.

**White rock.**—The south edge off this rock is the extreme south point of the Mexican coast, west of the gulf of Tehuantepec.

**Black rock.**—One-quarter of a mile west of the White rock is a small detached rock, black in color.

The coast recedes a little back of these rocks forming a shallow bay. The bottom is very foul, in fact full of sunken rocks, and no vessel should enter it, nor should she go within a mile of the rocky bluffs to the westward of White rock. A ship can go within a cable's length of White rock or the bluffs to the eastward or the westward of Port Angeles, as there is deep water and all dangers show themselves above water.

**Port Angeles, or Pachutla**, as it is called by the natives, is the port of entry of Oaxaca. The entrance to the bay is 2¼ miles from White rock. The west side of the bay is marked by a sharp rocky point 150 feet high, in which there are two or three caves or holes through which the sea washes.

**Angeles Bay anchorage.**—The bay is very small and of not much depth, but gives good shelter and an excellent anchorage for schooners and small craft during the dry season. Large vessels can anchor inside of the line from the outer SW. rock to the SE. bluff in 15 fathoms of water; bottom, gravel and sand, and, with 45 fathoms of chain, will swing clear of the rocks on either side. At times a very heavy swell sets in to the bay. To the eastward of the sand beach at the head of the bay, and out of sight from the entrance, are three or four buildings used as store-houses.

The coastwise steamers of the Pacific Mail Steamship Company call here twice a month *en route* to and from Acapulco.

**Supplies.**—Neither water nor supplies can be obtained; there is a small spring of excellent water near the head of the bay, but the quantity of water to be gotten from it is insignificant; there is good shooting, and small game is very abundant, and to the ambitious, opportunities are given to hunt the Mexican tiger and the tapir.

A very good road runs from Port Angeles to the city of Oaxaca. All the bluffs in the vicinity of Port Angeles are covered with a dense undergrowth and trees; their faces are bare, abrupt, and gray, while their bases, where the sea washes against them, are dark or almost black in appearance.

**Oil wells.**—About 1¼ miles E. of Port Angeles, between two large bluffs, is another sand beach about the size of the one at Port Angeles. but not so far back. Up the hillside back of this beach are two build, ings of a reddish color. These and the sand beach are good marks, when close in, for the bay of Port Angeles when coming from the eastward. Near these buildings are the "oil-wells," which are of very little value and are not worked at present. The land back of the bluffs between Port Angeles and Sacrifice is heavily wooded, but low and flat when compared with that to the eastward or westward.

The deepest water on any part of the coast from Mangrove point to Ventosa is found to the southward off Port Angeles and Sacrifice.

**Currents.**—Along the coast from Tartar shoals to Ventosa the currents are exceedingly irregular, both as to direction and force as well

as to duration, sometimes setting to the eastward with a velocity of from 0.5 to 2.3 knots per hour; within twelve hours they stop and run as strong in the opposite direction.

Commander J. W. Philip, U. S. N., says: "Once, while anchored half a mile off the beach to the westward of the Rio Verde, the current set N. 11° E., directly on the beach, at the rate of seven-tenths of a mile an hour, and while this lasted only three hours, it was long enough to affect a ship close in to the shore."

**Sacrificios bay** is a small harbor adapted only to small vessels. The soundings inside are regular. The whole shore of the bay has many outlying and sunken rocks, on which the sea breaks heavily.

**Sacrificios island.**—There is a passage between this island and the mainland with 4 fathoms, but it is not advisable to use it.

No water and but few supplies can be obtained at Sacrifice, which, though formerly a port of entry for the city of Oaxaca, is now abandoned.

**Cacaluta Island anchorage.**—To the eastward of Cacaluta island there is an anchorage in 7 fathoms of water and a good boat landing. When in the offing, abreast of Cacaluta, that island and the first bluff east of it appear as two bluff headlands, and both might easily be taken for islands. Back of the island the river Tayuta empties into the sea, and here fresh water may be had with little trouble.

**Bufadero.**—There is a cave called the "Bufadero" in one of the rocks, level with the water and close inshore, and every swell that comes in throws a quantity of water into it, and as the cave has a small aperture in the upper part of it, the water flies up, resembling the spout of a large whale. During the night time, or in foggy weather, when it is blowing off shore, or in a calm, the sound, like the blowing of a large whale, can be heard at some distance.

**Guatulco harbor.**—The Bufadero is the best and only well-defined mark for making the harbors of Guatulco and Santa Cruz. In fact those harbors are so difficult to distinguish that vessels have been upwards of a fortnight finding them. But with the Bufadero to the westward and Piedra Blanca to the eastward and the Cerro de Zadan bearing due north, there should be no difficulty in finding Guatulco.

The bays of Guatulco and Santa Cruz are together, being separated only by a small peninsula jutting out from the mainland four-tenths of a mile.

**The inner harbor of Guatulco** is the best and only one for small vessels from Acapulco to Ventosa. Here you can ride at anchor landlocked, whereas anywhere else the anchorage is open to the SW. winds, which often blow here. There is good clear ground anywhere and gradual soundings from 20 fathoms to 5 fathoms and 3 fathoms very near the beach. The bay is bounded by a smooth shore very good to land upon, and at the bottom of the bay there is a small fresh-water brook running into the sea during the rainy season.

**Santa Cruz bay**, which joins Guatulco bay, is much larger and more open, and an anchorage can be had in any portion of it in 5 to 10 fathoms, with shelter from all winds except those from the southward and eastward. As both bays are open, no sailing directions are needed except the common sense of keeping off the visible rocks and anchoring so as to have room to swing.

**Piedra Blanca.**—To the southward and eastward four-tenths of a mile in the continuation of the peninsula which separates the two bays is a reef of rocks two-tenths of a mile long, lying in an E. and W. direction. The westernmost one, which is 75 feet high and about a quarter of a mile in circumference, is called Piedra Blanca (of Guatulco), and is composed of eight or ten separate rocks, the smallest of which is barely above water. There is a passage between this reef and the peninsula, but it is not safe, as another reef extends some distance from the peninsula in the direction of Piedra Blanca. When in the offing perhaps the best mark for the harbor of Guatulco is the Cerro de Zadan, a bell-shaped mountain 13½ miles due north of Piedra Blanca. This is of reddish-brown color owing to the absence of any brush or undergrowth (this "brown" may be green during the rainy season), and at its northern side a ridge connects it with the higher range of the Cordilleras.

**Cerro de Leon** is 10 miles N. 56° W. of "Zadan," and is the highest peak along this part of the coast. The land back is covered with stunted trees and brush-wood, but over the foot-hills a few miles from the coast the land is well cultivated.

No supplies can be had in either of these bays except fresh water and fresh beef in small quantities.

When about 5 miles off shore from the bufadero the extreme western point of land has a rocky broken appearance, and is not so high as the land adjoining. When 6 miles out another cape farther westward can be seen. Its extreme point is rather low, but rises gradually inland to an elevation of 1,200 feet. This "low point" as it appears is the land of port Angeles.

**Tangola Tangola bay and island**, the bay which is next to, but separated from, Santa Cruz bay by a peninsula has several small rocky islets in it, that can be approached close to, and there is no danger in entering the bay to find anchorage, where there is good holding ground in from 5 to 10 fathoms, bottom of sand and shell. Off the western entrance there is a reef of rocks, but the water is deep close to the outer rock, which is awash. There is usually a very heavy swell setting in from the southward. Fresh water can be had with little trouble, as there is an excellent spring and stream at the head of the bay, but no provisions can be obtained. There is said to be good shooting in the vicinity, and pearl oysters and abalones are abundant here, in fact everywhere else along this rock-bound coast.

**Tangola Tangola island** is separated from the mainland by a channel with 3 fathoms of water in it. This passage, even though keeping near the mainland, is considered unsafe.

**Ayuca** is an open bay and vessels can anchor anywhere in it, being guided only by the draft of the vessel and the locality of Ranger rock and while it is open to all winds from the east and the south to southwest, yet it is a safe anchorage at all seasons.

The best anchorage, however, is in the western part of the bay in 7 fathoms of water.

**Estrete island** is a barren, rocky, white islet, composed of two rocks of about equal size and two or three outlying reefs. There is a passage between the island and the mainland, with deep water all around and close to the rocks.

**Coast.**—Between Morro Ayuca and Punta Chipequa are several bluff headlands with fine sand beaches between them. These bluffs, which are gray and almost perpendicular to the water's edge, do not project far out from the general coast line.

Back of the beach the hills are barren and brown, but during the rainy season their appearance is more pleasing. Twenty miles from the Ayuca and 8 miles from Estrete island there is a remarkable dome-shaped bluff, covered with a dense undergrowth of stunted trees and bushes.

**Rock awash.**—From one-half to one-quarter of a mile from this dome bluff there is a rock awash. At high water it cannot be seen, as the sea seldom breaks on it, but at low tide the sea breaks at each swell and the rock is visible. Seven to 12 fathoms are found close up to the rock. This is the only known hidden danger from Sacrifice to Ventosa.

**The currents** here are very irregular and at times very strong. (See winds and currents.)

**Bamba bay.**—At the dome bluff just mentioned the shore breaks away to the northward to Chipequa point and forms the bay of Bamba. This should not be entered unless actually necessary, as there are two sunken rocks in the western part, one-half to three-quarters of a mile from the sand beach.

**Chipequa point** is a very remarkable headland and one immense and growing "sand-dunes."

It projects nearly a mile from the line of the coast and forms a kind of double headland. At sea, from the westward, it shows as a bold, dark cliff, surmounted by a belt of sand over its top or back, and is an excellent landmark. This is the first sand-down seen from the westward, though there are two or three smaller ones between it and Ventosa.

**Punta Chipequa.**—The reef off this point consists of four or five detached rocks. Between the rocks and the shore there are only about 2 fathoms of water at low tide, while outside and close to the rocks the water is deep. It may be mentioned here that detached rocks and rocky reefs extend off all the points from Sacrificios to Ventosa, and it is not prudent to go within half mile of any of them.

**Chipequa bay and anchorage.**—Commander J. W. Philip, U. S. N., says of this bay: "Although Chipequa bay is open to all winds from the NE. to S., I consider it the best anchorage in all seasons from Acapulco to La Union. It is far more commodious and better protected; has a better boat-landing, less surf, and is in every way superior to either Ventosa or Salinas Cruz. At the full and change of the moon a heavy swell alway sets in and increases the surf on the beach, but during a number of visits no boat ever swamped or capsized, although landed at all hours of the day and night."

**Anchorage.**—There is good holding ground in all parts of the bay, but the best anchorage is in the western part between the reef of rocks and the sand beach to the northward. No supplies of any kind can be obtained here except water, and that only in small quantities.

**Coast.**—There are four bays or anchorages between Chipequa and Ventosa point, viz, Chipequa, Conejo, Salinas Marques (sometimes called Salina Marques), and Salinas Cruz. The whole of this coast can be approached within a mile in safety, while off each bluff are detached rocks showing above water, and between the bluffs are stretches of sand beach on which the surf breaks heavily. On Conejo and Morro de Salinas Marques are sand downs which are not so extensive as that on Chipequa point. Conejo bay is open to easterly and southerly winds. The soundings are even all over the bay and the holding good, but on account of the heavy surf rolling in on the steep beach there is no boat landing.

**Salinas (or Salina) Marques bay**, a little larger than Conejo, lies in the same general direction, and while the soundings are regular on a hard sand bottom, there is no boat landing. Back of the sand beach there is a large lagoon which discharges into the sea during the rainy season. The two bays just mentioned are of but little or no use, owing to the close proximity of the bays of Chipequa and Salinas Cruz.

**Morro Salinas Cruz** is a round rocky projection, just outside of which are several clusters of rocks above and under water.

**Salina Cruz bay**, formed by a slight indentation of the coast between the Morro Salinas and Ventosa point, is exposed to all winds except the "norther," which here blows with great fury. In anchoring, run in as close to the beach as possible and let go. The bottom is hard sand over mud. The bay is surrounded by hills on its northern and western sides, ranging in height from 200 to 2,000 feet high. Five miles from the anchorage is a remarkable "whale-back" mountain, called "Tecuani."

**Shadani**, 3½ miles from the anchorage and 1¾ almost due east from flat-top Pecuani, is a remarkable square, flat rock, 60 feet high and 150 feet square, on a peak 1,000 feet high. This "house rock," called the Sha-dani, resembles a house when seen from a distance of 2 or 3 miles at sea. The flat-top mountain and this rock are the two best landmarks for Salina Cruz when approaching from the sea, as they can be seen and recognized farther than anything else.

# CHAPTER V.

## FROM SALINA CRUZ TO FONSECA—WINDS, TIDES, CURRENTS, ETC.

**Salina Cruz** is the port of entry of Tehuantepec, the custom-house having been brought here in 1862 from Ventosa owing to the worthlessness of that bay. The village, which consists of about a dozen huts and sheds, is situated on the western side of the bay near the beach; there are the ruins of a large building on the elevated ground some three or four hundred yards back of the village. It is only of importance as being the southern terminus of the proposed canal or a railroad across the isthmus of Tehuantepec and its being the port on the Pacific ocean for the city of Tehuantepec. The Pacific Mail Steamship Company's coast steamers call here on their way to and from Acapulco to land and take freight and the mails. Communication with the shore is had by means of surf-lighters, especially built for the purpose, and which pass through the surf on a rope stretched from the shore to a buoy moored well outside of the breakers.

**Boat landing.**—There is a good boat landing here; watch your chance and beach the boat through the surf seems to be the only way of communicating with the shore. No water and very few provisions or supplies of any kind can be obtained.

**Tehuantepec city**, lies almost due north 9 miles from the Salinas Cruz. There is a good wagon-road from the port to the city; the distance being 12 miles. The city is situated on the Tehuantepec river and is in telegraphic communication with the world. At Salinas Cruz and Tehuantepec the United States is represented by a consular agent.

**Ventosa bay** cannot possibly be mistaken, as it is the last high land on the western part of the gulf of Tehuantepec.

**Ventosa bay.**—The soundings in the western part of this bay are irregular, and on acount of the great amount of sediment brought down by the Tehuantepec river during the rainy season, this part of the bay is fast filling up. Owing to this fact and the great difficulty in making a landing in the best of weather, together with its known inferiority to Salinas Cruz, the custom-house, &c., was transferred to the latter place in 1862.

**The greatest current** is found off the heads of Acapulco, setting about S. 68° E. from 0.3 to 2.3 miles per hour. This current is influenced by the wind, and is more rapid on the ebb tide.

**The tides** are regular, the ebb setting to the southward and eastward, and the flood to the northward and westward, inshore.

At and near the full and change of the moon there is always a heavy swell setting in on the beach from the southward and westward, decreasing as the moon quarters.

**Winds.**—Along the coast of Mexico northerly winds prevail in winter, and SE. and SW. in summer. The land and sea breezes are regular when close inshore; northerly at night and SW. in the afternoon.

Of currents, Captain Parker says:

Between point Tequepa and Acapulco: In July, eastward 1 knot; in June, westward 0.7 knot; in April, eastward 0.5 knot; in January, eastward 1 knot.

Between Acapulco and Port Angeles: In July, eastward 0.5 knot; in December, westward 0.5 knot; in January, eastward 0.6 knot; in October, westward 0.5 knot; in January, eastward 1 knot.

**Current along shore in Tehuantepec gulf.**—The currents which are specially under the influence of the winds are particularly so in the gulf of Tehuantepec during the season of the "northers." When a norther is blowing the current sets strong to the northward and eastward along the shore on the west side of the gulf, and to the northward and westward inshore on the east side of the gulf; at other times the current sets in the opposite direction, and it is accounted for in this way; the fury of the norther blows the water out of the gulf to the southward, and as the waters lower at the head, there is a rush along each shore *to the northward*, to supply or fill the vacancy. When the "norther" moderates or ceases to blow, the water that was "banked up" as it were flows back up the gulf, and the extra amount rushes out along each shore to the southward and eastward on the east or Guatemala shore. As this fact has been observed as far east as the Rio Verde, and down the east coast as far as Champerico, mail steamers and coasters should note carefully the currents in coasting the gulf from either direction.

Off Sacrificios, the current setting to the northward and eastward has been found as high as two (2) miles per hour during a heavy norther, and one and six-tenths (1.6) per hour setting to the southward and westward when the wind was from the opposite direction.

The strongest current was off the "rock awash" 3 miles west of point Chipequa, 2.3 miles per hour.

Along the coast from Manzanillo to point Sacrificios the current is supposed to set to the SE. and east during the winter months, and to the NW. and west in summer when SE. winds prevail. This is not, however, always the case.

In the gulf of Tehuantepec, on a line between Acapulco and Montuosa islands, the current generally sets to the WNW., but running over to the coast of Guatemala, the current will probably be to the SE. and east as the coast is approached.

**Northers.**—A gray mist hanging over the mountains and a red sunset, the red extending toward the zenith, are sure indications of a

norther. If, on entering the gulf, either from the eastward or westward, a northwesterly swell is met with a norther will surely follow. Sometimes double-headed clouds are seen to the northward, with clouds or mists hanging over the tops of the mountains; at others it will blow a fresh gale without a cloud in the sky. The barometer does not indicate them, nor does the temperature of the water. These winds commence from the NE. or NNE., veer round to the northward, and in the gulf veer to the NW., and finally die out at west as the coast of Guatemala is approached.

**Crossing the Gulf of Tehuantepec.**—In the foregoing directions it is supposed to keep close along the shore of Tehuantepec down the coast during the season of the northers. This is not considered the best plan. After passing point Sacrificios steer directly across the gulf, say N. 82° E., then, in case of a norther setting in, keep the ship off so as to bring the wind and sea one or two points *abaft the beam*, and make a run for it. Should it be necessary to keep to the southward of this course, say SE., the wind will veer to the northward and westward, enabling the ship to come up gradually to the course, and as the coast of Guatemala is approached it will veer more and more to the westward until it dies out. This is much better than to haul up to the northward in order to get under the lee of the land.

When bound *up*, hug the Guatemala coast and follow close around the gulf shore; the wind then is constantly hauling ahead, and although it will be frequently found that, after passing Soconusco bluff in a norther, the wind will temporarily die out, it will be pretty sure to freshen up again, in which case the better plan is to continue to hug the coast. If it should be blowing a norther at the time of passing point Sacrificios, then go up at least as far as Estrete island, keeping a mile or two off shore.

In the gulf of Tehuantepec north winds prevail (sometimes with great violence) from November to April. In summer SE. and southerly winds.

Of currents Captain Parker says:

Between Morro Hermosos and lat. 15° 16′ N., long. 94° 37′ W., in October, westward 0.5 knot.

In April, between lat. 16° 09′, long. 95° 00′, and lat. 14° 18′, long. 92° 00′, westward 0.5 knot.

In October, between lat. 15° 16′, long. 94° 37′, and lat. 13° 35′, long. 91° 30′, north 0.5 knot.

In October, between lat. 15° 40′, long. 94° 31′, and lat. 15° 07′, long. 95° 38′, southwest 1.0 knot.

In October, between lat. 15° 07′, long. 95° 38′, and lat. 15° 26′, long. 96° 00′, northwest 1.0 knot.

In October, between lat. 15° 40′, long. 94° 31′, and lat. 13° 37′, long. 91° 10′, eastward 0.5 knot.

In January, between lat. 15° 41′, long. 94° 00′, and lat. 15° 47′, long. 97° 00′, eastward 0.5 knot.

In October, between lat. 15° 43′, long. 96° 43′, and lat. 15° 00′, long. 93° 12′, NW. by W. 0.7 knot.

**Winds—Gulf of Tehuantepec.**—The heavy blasts which blow over the isthmus of Tehuantepec derive their source from the country which they cross, and are caused by the "northers" in the gulf of Mexico, which here find a vent through the opening formed between the Mexican and Guatemalian mountains. They blow with great force from north to NNE. and raise a very high, short sea, and are felt several hundred miles off the coast. During the season when they prevail (December to April) every preparation should be made to meet and carry sail through them; if this can be done they are soon crossed, and 200 or 250 miles of westing; (or easting made) otherwise, if you are obliged to heave to, 36 or 118 hours of heavy weather may be expected, exposed all the while to a very high and short sea. In the rainy season they cease, but the weather here, as along the whole coast of Mexico, is then very bad; gales and strong breezes from SE. to SW. constantly occur, whilst squalls, accompanied by thunder and lightning, with heavy and almost incessant rain, characterize the season throughout.

These gales are at times very severe, rendering the navigation of such a coast very unpleasant, as, with one exception, there is scarcely any shelter from them to be found. During the fine season, however, nothing can be more regular or quiet than the weather on the Mexican coast; a regular sea breeze sets in about noon, beginning from SSW. to WSW. and getting more westerly as the sun goes down, decreasing with it, and gradually sinking into a calm as the night closes in. This is succeeded by the land wind off the shore, which is more irregular in its direction and force; but these winds, and the method of making a passage to the westward along the coast, have been so well and so truly described by Dampier and Basil Hall, that nothing remains but to add testimony to the correctness of the accounts they give, as far as the phenomena fell under observation.

As soon as the coast begins to trend northward again, which it does about Tejupan point, northerly winds are met, which blow down the gulf of California, and which are found a few miles off the coast pretty steady during the fine season. By taking advantage of these, and the daily variations caused by the land and sea breezes, the passage is made from this point to San Blas and Mazatlan; but it is always a tedious beat, owing to a contrary current and frequent calms.

**Ventosa Point to the Gulf of Fonseca—General remarks.**—To the eastward of Ventosa the coast line forming the head of the gulf of Tehuantepec sweeps away in a gradual curve forming the arc of a circle of large radius, the character changes and the shore line is a whitish gray sand beach that extends away to the eastward some hundreds of miles, unbroken by a single rock. To the southward and westward of Ventosa, to and beyond the turn of the gulf coast at Port Sacrificios, the shore line is of a rocky and bluff character with intermediate sand

beaches, while the mountains are rugged and stand not far back from the shore.

The depths change from deep water, close up to the bold bluffs, to a gentle shelving bottom with only 30 fathoms of water in places, 15 miles from the shore. The mountains to the eastward somewhat resemble table-lands, and sweep away inland to a maximum distance of about 25 miles, leaving a large low area partly occupied by an extensive lagoon with its numerous branches or divisions and a few scattering hills or mounds, ranging from 236 to 2,280 feet in height, the highest standing farthest to the eastward.

This area is sparsely wooded and parts of it are under cultivation, while large numbers of cattle graze in the open.

The mountain chain forming the backbone of the continent here becomes confined to the narrow limits of the isthmus and also becomes lower, affording in one place a pass, through which a survey for a proposed inter-oceanic ship canal is located. A telegraph line crosses the isthmus here, starting at Salinas Cruz, connecting with the telegraph cables on either side that form a part of the North and South American telegraphic system.

After this low place is passed, the mountains gradually begin to rise and spread out, approach the coast line again until, at Soconusco bluffs, a detached cluster of hills very near the beach form a prominent landmark. Farther to the eastward the mountain chain extends nearly parallel with the shore line, and between it and the shore there lies a low, wooded belt filled with many lagoons.

The entire coast line from Ventosa point to Acajutla is a sand beach with not a single outlying danger, while back of the beach is a lagoon which extends nearly the entire distance, and it is fed by the streams and rivers flowing down to the coast.

**Winds.**—Besides the variable wind, which are rather light, and the land and sea breezes of the morning and evening, two prevalent winds, the NNE. and SSW., blow during a great portion of the year on the southern coast of the isthmus. The first of these is not felt to the eastward beyond the Boca of Tonala, nor to the westward beyond the mountains of Chahuhe, the west bounds of the lagoon of Tongulunda. The NNE. wind, which usually begins about the 15th of October and ceases in the first part of April, in November blows almost without interruption, and at that time reaches its maximum, while towards the middle of December it ceases during intervals of from ten to twelve days, and then begins anew to blow one or two weeks. These alternations or interruptions are reproduced at short and unequal periods. The length of the period of discontinuance goes on gradually increasing till the wind only blows one day and finally ceases completely.

The Indians of Santa Maria del Mar, who are familiar with the coming of the NNE. winds, say if about sundown the summits of the mount-

ains of Guichiconi and San Miguel Chimalapa (seen from the coast) are concealed from view by quantities of slate-colored vapor it is an indication that the "northers" will blow the following day and last as many days as the summit of these mountains continued to be covered with similar clouds. Vapors of a corresponding hue, seen at the same hour, on the horizon of the Pacific ocean announce that the SSW. winds will blow the day following.

The SSW. wind, which in winter succeeds the northerly, during the one or two days of its cessation, is the only general wind prevailing during the months of June, July, and August. After some gales of more or less intensity, which may be compared to the violence of the northerly wind, and not exceeding one and a half or two hours' duration, the southerly wind is definitely fixed; still, this wind is subject to more interruption than the north wind and the intervals of repose are longer. After passing over the ocean this wind reaches the coast of the isthmus laden with vapors which at certain hours of the day resolve themselves into abundant showers. In winter and in summer, during the prevalence of the southerly and northerly winds, the current of the sea is from east to west; its greatest velocity is about 1½ miles an hour.

**San Mateo.**—The village is about 5½ miles from Ventosa point and three-quarters of a mile from the beach. The whitewashed or painted dome of the church can be seen some distance to seaward, and forms an excellent landmark when the mountains are obscured. The country in this vicinity is low and sparsely wooded and cut up by branches of a lagoon extending behind the beach.

**Santa Maria del Marka Salso** is a whitewashed cathedral tower on an open cupola, which, standing up from a group of scattered palmetto trees, forms a good mark. The lagoon back of these villages, which extends 13 miles from the beach, is broad and open like a lake, and is fed by small rivers and streams. Several small villages stand on its shores.

**San Francisco bar to Tonala bar.**—The shore line sweeps around in a gentle curve and is an unbroken sand beach, upon which a heavy surf is almost constantly breaking, rendering landing extremely difficult. Occasionally the surf is light, and a landing can be made at any point. Between these two bars the country is low and wooded. A lagoon extends a short distance back of the beach.

**Tonala bar**, in its narrowest place, is about seven-eighths of a mile wide and on the eastern side a growth of trees seems to come down close to the water's edge. There is, however, a channel, and vessels of light draught can cross at certain stages of tide and sea, but the bar is continually shifting. An anchorage can be had half a mile outside the center of the breakers in 11 fathoms of water.

**La Puerta**, the place of embarkation for the town of Tonala and its port of entry, consists of four houses or sheds used as habitations, store-

houses, and lighter shelters, and is not easily distinguished any distance at sea. A good mark for finding it in all weathers is Tonala bar itself, but in clear weather the high peak of Tres Picos is an excellent landmark. It is a place of call for the Pacific Mail steamers (one steamer each way every month), and the company has a number of buoys moored outside the breakers for use in working the lighters.

**The anchorage** is directly off the houses, in 10 fathoms of water. The custom-house officers are provided with a set of international signal flags and understand their use.

**San Bernardo.**—These hills, wooded and green in the rainy or tropical winter, and light brown in the dry season, standing as they do so near the shore, and seeming to abut upon it, form the best landmark in all seasons for this part of the coast.

**San Benito** consists of about 40 thatched houses on the beach, and of these the Pacific Mail agency and the custom-house, with flag-staffs in front of them, are the largest and stand nearest the water.

Lighters afford the only means of landing. The buoy moored outside, with a surf-line fast to it, is used through the heavy surf that runs at times. The Pacific Mail steamers call here; one steamer each way every month.

**Tapachula**, about 15½ miles from San Benito, is the port for the agricultural and stock-raising country adjacent, but the monthly steamers seem to do all the carrying trade.

The United States is here represented by a consular agent.

**Champerico.**—Until recently this village was only a stopping place for the Pacific Mail steamers, once a month, and the port for the western part of Guatemala, but now a railroad running 50 miles back into the country has increased its importance as a port of entry and brought about a number of improvements. There are already many substantial buildings, and more are building. A heavy surf renders landing dangerous, but an iron pier, between 1,300 and 1,400 feet long, has been built with steam hoisting apparatus, and a cage for landing passengers for which a fee of $2 is charged for each passenger and baggage. Iron ladders can be found on either side of the pier for landing from boats. A small light is displayed at night from the house at the end of the wharf.

The swell here is rather heavier than at any place on the coast. At times it is difficult to land or to take on cargo unless the vessel is sprung around, head to sea.

**The exports** are coffee, cochineal, and india-rubber.

**The imports** are railway material and general merchandise.

The United States is here represented by a consular agent.

**San Luis, Sesecapa, Tegojate, and San Geronimo** are only small villages and of no importance except for their exports of coffee.

**San José de Guatemala**, the chief sea-port of Guatemala on the Pacific coast, is increasing in importance on account of the railroad which runs

from here to the city of Guatemala. It has already about 1,000 inhabitants, is healthy, and has no endemic disease; the thermometer ranges from 90° to 68°. Quarantine is maintained by the captain of the port, who will not allow passengers or freight to land unless the ship has a clean bill of health; there is neither hospital nor doctor. It has an open roadstead with safe anchorage in from 9 to 10 fathoms, 1 mile from shore.

**Winds.**—From July to October SW. and westerly winds prevail, with heavy squalls and frequent rains. The winds, as at other parts of the coast of Central America, are, from November to May, generally from SE. by S. to W., from 10 a. m. to 8 or 9 p. m.; a short interval of calm then follows, which is succeeded by light winds from N. to NE.

**The current** is strong and changes with the tide.

**Water**, brought from Novanjos, a station on the railroad, is dear, but the supply is abundant, and can be brought by giving notice to the railroad authorities. Supplies can be obtained here, but not in large quantities; they are very dear and not to be depended upon.

**Pier.**—There is a good iron wharf, extending 900 feet outside the surf, for the accommodation of lighters and small craft. Ships should have their cargoes delivered alongside, as lighterage is very high. Ballast is almost impossible to obtain and ships should bring it with them.

**Telegraph.**—There is telegraphic communication with the city of Guatemala.

**Mail.**—The mail leaves every day by rail for the city of Guatemala and by the Pacific Mail steamers twice every month, both north and south, and the coast line.

**Dues, &c.**—License, &c., $5.75 for a ship of 1,200 tons. Use of pier, $16. Tonnage dues, 25 cents per register ton. Light dues, $7.50 for a ship of 1,200 tons.

In anchoring off San José, or in fact off any of these ports, the farther off from the beach the less the swell will be.

The United States is here represented by a consular agent.

**Istapa** is a small town of no importance. Between here and Acajutla a number of native villages are to be seen.

**Acajutla** is the port of entry of Sonsonate, 12 miles in the interior, and the two places are connected by a railroad. The custom-house and huts comprising the town are on a height overlooking the shore, and are not distinctly seen from a distance, but the harbor flag-staff is a good guide. The harbor is an open roadstead, partially sheltered by a reef of rocks off point Remedios.

**Caution.**—Vessels should not approach point Remedios nearer than 2 miles.

**The marks for the best anchorage** are, point Remedios S. 45° E. to S. 51° E. and flag-staff N. 45° E. to N. 56° E. in 8 or 10 fathoms of water. In winter it is safer to anchor farther from shore in 12 to 15

fathoms. In making the anchorage, bring the volcano Isalco to bear N. 40° E., which will lead in until the port is made.

**Landing** is difficult and vessels are obliged to load and unload by means of bungos or large lighters built like a whale-boat. A buoy is now moored outside the iron mole which has been recently constructed.

**The only port charges** levied on vessels in the ports of San Salvador are 10 cents per register ton and an entrance fee of $5 to $15.

The Pacific Mail steamers, the Acapulco line and the Champerico line, call at this port twice every month going north and south.

**The imports** are provisions and general merchandise.

**The exports** are coffee, sugar, indigo, balsam, and tobacco.

**La Libertad** is the port of the city of Salvador, the capital of the State of that name, and consists of a few houses, one of which is the custom-house.

The harbor is an open roadstead, and is exposed to the full sweep of the Pacific. The port can be considered safe in fine weather or from northerly winds, but should not be visited from July to October. At times the beach is smooth, but at full and change of the moon the rollers, which set in suddenly and are apt to snap cables unless anchored with a long scope, break at times in 4 or 5 fathoms at least a quarter of a mile off the beach, making the landing bad.

**Supplies**.—Poultry, bullocks, &c., can be obtained, but compared with those of San Salvador or Realejo the prices are exorbitant. Water is obtained with some difficulty from the small river of Queloma, about half a mile westward from the houses.

When bound to this port from the southward vessels should sight the volcano of San Salvador and steer with it bearing N. 12° E., as it will lead to the roadstead. If coming from the eastward or westward, follow the coast about 5 or 6 miles distant.

**Telegraph**.—The Central American cable lands here.

**Steamers**.—The Pacific Mail, the San Francisco and Panama line, and Champerico and Panama line call twice a month going north and south, and the Acapulco and Panama line once a month.

**Lempa river**, the current of which runs 4 or 5 miles an hour, is the largest in San Salvador, but is navigable for river steamers only 24 miles The entrance is known by some large trees with white trunks and tops almost bare, which rise above the lighter colored and lower woods, similar to the copse wood of mountain countries. All the rivers have bars on which the sea breaks.

**La Concordia**.—At the mouth of the lagoon of Jaltepeque is the por. of anchorage of La Concordia, which has lately been opened to foreign commerce.

**Lempa shoal**.—Properly speaking this is not a "shoal" but a horseshoe bar, which is continually shifting and extends nearly 2½ miles off the mouth of the bay of Jiquilisco, or the Bahia del Espiritu Santo of

the natives. The rise and fall of the tide is about 10 feet and a vessel of moderate draught can cross by taking advantage of tide, wind, and sea, having previously sounded and marked the channel.

In passing the shoal from east or west the lead is a good guide, for in the vicinity the soundings gradually decrease to the edge of the breakers. In passing, it is not prudent to go within the 10-fathom line. In passing along this part of the coast from Lempa shoals to Amapala point the distance of the coast line and line of breakers is deceptive, and it should be approached with caution.

# CHAPTER VI.

## FROM GULF OF FONSECA TO GULF OF NICOYA—WINDS, CURRENTS, &C.

During the dry season, which begins in November and lasts until May, the weather is fine on the Pacific coast of Central America. A light land breeze generally springs up before midnight, and in the forenoon the sea breeze sets in and lasts till sunset. Opposite the lakes Nicaragua and Managua violent winds, called Papagayos, varying in direction from NNE. to ENE., come after the rainy season is over, and reach their maximum of strength in December or January; these are often accompanied by a clear atmosphere and a cloudless sky. Sir Edward Belcher, R. N., remarks that their full force is seldom felt more than 20 miles from the land, and M. de Laplin recommends keeping 30 and even 45 miles from the shore, if it cannot be coasted within 5 or 6 miles. The gusts are said to attain their greatest force during the forenoon, and to decrease about sunset; but too much dependence should not be placed upon this, since heavy squalls have been met with at night. The tendency of the wind, under certain conditions, to rush down the seaward slopes of mountain ridges should not be lost sight of by vessels keeping near the land.

In the gulf of Nicoya, and on the coast below, the northers are sometimes felt for a day or two. Late in the season the sea breeze freshens considerably towards sunset, in and near the gulf of Fonseca. During the months of March and April the natives clear the land by burning the brush, and sometimes the smoke is so dense that the mountain peaks are obscured. The dry season is called by the Spaniards, Verano de la Mar del Sud (summer of the South sea).

The rainy season lasts from May until November, but at first only occasional showers are experienced, generally in the afternoon. The officers of the Pacific Mail Steamship Company do not anticipate bad weather on the coasts of Nicaragua and Costa Rica before the middle of June. Later in the season calms and southerly storms prevail, the rain falls continuously, while thunder and lightning are at times incessant. Commander Wood, R. N., says: "From May to November, which is the rainy season, the weather is mostly bad; gales from the W. and SW., with thunder, lightning, &c., being frequent and at times violent." Other authorities refer to gales from the SE. and S. as well. In his remarks about the anchorage at San José de Guatemala, Capt. W. H. Parker, Pacific Mail Steamship Company, says: "A southeaster brings

in a heavy sea, and sometimes communication is impossible. This whole coast is at that season subject to very violent squalls of wind and rain, attended with heavy thunder and very vivid lightning. These squalls are called Chubascos." The natives at Corinto expect a heavy southwesterly gale on or about the 4th of October, and an interval of comparatively clear weather between the 15th of July and the 15th of August.

**Current.**—The current during the dry season generally sets to the northwestward, but only off Guinonos point, where the velocity is sometimes 2 miles per hour, does it run uniformly in that direction. The alternate currents on the coast of Mexico, that are felt as far east as Cocos island, are said to give rise to counter currents inshore, but the officers of the Pacific Mail Steamship Company have never remarked a steady southeasterly set near the coasts of Nicaragua and Costa Rica during the rainy season. The force of the current off Guionos point would indicate some local agency, and, as it is strongest when the Papagayos are blowing, it may be that so much water is driven out of the gulf to the westward that an influx is occasioned. Crossing the entrances of the gulf and bays, the tides will be felt, and the set should be allowed for during thick weather or at night.

**The gulf of Fonseca,** sometimes called Conchagua, contains the port of La Union in Salvador and that of Amapala in Honduras, and is the outlet of the Estero Real, a navigable river of Nicaragua. The entrance to this gulf is plainly marked by the volcanoes of Conchagua and Conseguina.

There are a number of islands in the gulf, but only the largest and those that by their situation affect the approaches to the inner waters of the gulf need be mentioned.

**The Farallones** are a group of light-colored rocks, the largest in the center, having a rounded top, while the others are sharp and jagged. It would be prudent to keep half a mile from them.

**Manguera island** rises abruptly on all sides. East of it there is less than 3 fathoms; south of it is a rock on which the sea occasionally breaks, but from all other directions it can be approached close to. Off the SE. point is the small island of Manguerita or Perigallo.

**Conchaguita island.**—The central peak throws out spurs to the north and south, and these shoulders are well defined when approaching from the W. and SW. The shoal extending NE. from it prevents all except small vessels from doubling it on the inshore side. There are no other dangers near it.

**Tigre** is nearly circular, being simply a conical mountain.

**Sacate Grande,** or Velasques island, is the largest in the gulf, and the only one not densely wooded to the summit. Several of its peaks are 2,000 feet high and covered with grass.

**Directions.**—Entering the gulf from the westward, keep at least a mile from Amapala point, and do not go inside of 5 fathoms while run-

ning up the western shore; if from the eastward, pass Conseguina point a mile off, and if bound for the Estero Real, keep about that distance from the shore until the Farallones are abeam.

**Money Penny point** is low, but the water is deep close to, and the anchorage to the eastward, where vessels may wait before attempting to enter the river, is well sheltered.

**La Union.**—The western arm of the gulf forms the capacious and land-locked harbor of La Union, which is situated on the southwestern shore, 4¾ miles above the entrance. On the north side of the bay are extensive mud flats that contract the channel in places to less than a mile in width, while another in front of the town uncovers at half tide, virtually cutting off all communication with the shore. This flat has encroached upon the anchorage since Sir Edward Belcher's survey was made, diminishing the depth slightly and shifting the channel a little to the northward. A small pier facilitates landing at high water, and on the outer end of it a light is sometimes shown, but it is valueless, being dimmed by the lights in the town behind it. The population is estimated at 2,000. Coffee, cotton, hides, and balsam of Peru are exported. Beef, poultry, and oysters can be obtained at reasonable rates. As ships find great difficulty in watering here, it is recommended to anchor and fill up at the spring, 1 mile below Chicarene point. The United States is represented by a consul and vice-consul.

**Directions.**—If bound for La Union, keep to port of all the islands and steer to come between Conchaguita and the western shore under the volcano of Conchagua. When fairly in mid-channel the entrance to the harbor will be seen ahead between Punta Sacate island on the right and Chicarene point, which terminates the eastern slope of the volcano on the left. Steer nearly for the point, and even bring it a little on the starboard bow if the flood tide is running as it sets across the shoal north of Conchaguita. As the point is approached open it a little from the north end of Punta Sacate and run past, giving the island the widest berth, as there is a rocky patch making out from the southwest point.

It has been recommended to keep Chicarene point close aboard, but a steamer drawing 15 feet touched a rock in doing so; therefore a safe rule would be to keep a little to the westward of mid-channel. During the springs the tide runs through the pass at the rate of 3 knots an hour.

**Amapala.**—Behind Tigre island, which protects it on the south, is the port of Amapala, easy of access, and with good holding ground. The town, which has an estimated population of 1,500, occupies a narrow shelf on the north side of the island at the foot of Tigre mountain. There are no wharves, but the beach is steep and lighters can load with facility. All trade with the interior is carried on by means of boats through Cismuyo bay and the esteros leading into it. The principal exports are coffee, cotton, hides, and indigo. Fresh beef and poultry

are plentiful and cheap; oysters are to be had at times, but vegetables are scarce. Water can be obtained from wells.

**Directions.**—Making Amapala from the westward, steer for mid-channel between Conchaguita and Manguera islands, so as to bring the high conical peak of Tigre between them, then run directly for it, taking care not to be swept by the flood north of a range between it and the southern end of Conchaguita island, as there are shoals on the port hand. When Disposicion has fully opened from Sacáte Grande the shoal will be passed and Tigre island will be a mile distant. Anchor in front of it, and not over half a mile from the beach. The portion of a wreck which shows at low tide is 325 feet from Knob island.

Coming from the eastward, having doubled Conseguina point, steer to the northward, passing the Farallones and the little island of Marguerita, and then bring the latter on a range astern with the westernmost of the Farallones.

**Cismuyo bay**, 3 miles north of Amapala, with the entrance between Sacate Grande and Disposicion islands, extends beyond the islands into the mainland, but its shores are low, marshy, and covered with mangroves. Near the head is La Brea a small collection of huts, connected with Tegucigalpa, the capital of Honduras, by a road; here all merchandise to and from Amapala is transshipped by boats.

**San Lorenzo.**—East of Tigre and Sacate Grande islands is San Lorenzo bay. This insignificant village of the same name is situated on the left bank of a narrow, tortuous estero, 3 miles above the head of the bay. The bay can never be made available for commerce until the narrow channel leading into it is lined with buoys and beacons. Three fathoms can be carried in at low water, but in several places the width of the channel is little over 200 yards. For 6 miles the course is amongst banks and shoals before it nears any point sufficiently to make bearings available. With the chart, vessels drawing under 12 feet might enter, but there is still danger, as the channel shifts; several places were noticed in which the tide flowed with considerable force across the banks. Large vessels should not attempt it without planting buoys, at least between the bar and Raton island. Above Raton the channel is wide, and can be easily navigated; here the anchorage is always good, for, though the bay is open to the entrance of the gulf, the shoals and flats form an excellent breakwater. The sea-breeze raises the water at the head higher than at any other place in the gulf; on one occasion a rise and fall of 14 feet was noticed. The western shore of the bay above Sacate Grande island, and all the eastern, except a small strip on Raton island, is lined with mangroves. There are numerous esteros, but in none of them except that of San Lorenzo can boats penetrate beyond the low swampy land. From San Lorenzo bay to the mouth of the estero Real the shore continues low, and the water is so shoal that at one point only 3 fathoms can be carried to within 2 miles of the land. The

natives call this place Condega, and it is reported that several vessels have loaded here with dye-wood. Several rivers enter the gulf between Condega and the Estero Real, but they are either choked with bars and mud flats, or they are too shallow, after a few miles, for anything but lighters and small boats.

**The Estero Real.**—This broad navigable river enters the gulf near the head of the large bay behind Conseguina volcano. On the bar there are 2½ fathoms at low water, and from the mouth to the junction of the estero Palomina, 20 miles above, the depth is sufficient for the largest ships. Up to this point the tides are but slightly affected by the river current, consequently there is but little trouble in ascending with the light prevailing winds. Above it the depth diminishes rapidly, and 1½ miles farther on the stream is compressed between two rocks. Dye-wood, the only article of commerce, is cut and shipped in large quantities; the country contiguous to the water-courses is being rapidly stripped of it. Little in the way of supplies can be obtained on the estero. Ducks, curlew, and pigeons are plentiful. There is a spring near Nagascolo, and another at Tampisco that uncovers at low tide, but the flow is so small that ships should water if possible before entering the river.

The large bay into which the Estero flows has shoals and flats over nearly all the upper portion, and the channel leading across them begins properly 7½ miles above Monypenny point. Having reached this point, steer S. 34° E. until Conchagua volcano is just inside the shore line on the south side of the bay, and then steer on this range. The shore astern being low when the point selected dips, edge off to the southward so as to keep the volcano at all times in range over the visible land. To insure this change in range, the height of the eye should be less than 20 feet. This will keep the vessel in the curve of the channel until the mouth of the Estero is fairly open, and when you can see well up the first reach, starboard and run in.

Eight miles above the mouth, on the left bank, is Playa Grande, consisting of a custom-house and one or two huts. Five miles farther on, the stream is narrowed between two ledges, but by keeping in mid-channel they will be avoided. Thus far the banks have been low and the country level, but 4 miles above the narrows Nagiscolo hill rises from the south bank of the river, and a little above it ships generally lie while loading. After two or three bends a 2-mile reach succeeds, and at the upper end the Estero Palomina joins the main stream. The Tampisque creek also flows into this reach from the southward, half a mile below the junction.

From Conseguina point the coast of Nicaragua preserves a general direction of S. 56° E. to the eastern boundary at the head of Salinas bay. The volcanic peaks and mountain ranges near the sea are so distinct in outline or surroundings, that they are easily recognized when approaching in clear weather, and as occasionally they become visible

during the rainy season, when observations have been obtained, the advantage of being able to distinguish them cannot be overestimated.

**Conseguina** will be seen when nearing the gulf of Fonseca. To the eastward the country is broken and hilly for about 20 miles, and then nearly level for 10 more to the base of the Viejo group of mountains.

**Viejo or Chinandega**, 36 miles from Conseguina and 17 miles inland, is next to Ometepe, the highest mountain in Nicaragua, and is directly back of Corinto, or Realejo, which is the most important seaport. The summit is very sharp and in appearance has been cut off at an angle. On the west side two small peaks rise near the base, while on the other side a high ridge shoots out for 2 or 3 miles and then sinks down to the foot-hills. Viejo is really the first of the Marabios range which extends nearly ESE. and terminates in the volcano of Momotombo. The volcanoes of Telica, San Jacinto, Rota, Las Pilas, and Assoco, are also included in this range, but as Viejo and Momotombo are higher than any between them they alone are especially valuable as landmarks.

**Momotombo** is a conical mountain, so regular in outline that it cannot be mistaken for the lower and more rugged peaks to the left. At present it shows signs of activity, and smoke is often seen issuing from the summit.

**Cerros de Managua.**—This long rounded ridge, shows a regular curved outline for nearly 15 miles, and is southeast of Momotombo and parallel to the coast.

**Mombacho** is very irregular in outline and shows two peaks when seen from the westward, over the Cerros de Managua, and three from the southward. The eastern summit is the highest and is remarkably sharp.

**Ometepe** is in the lake of Nicaragua, and over the high land to the Pacific shows a perfect frustum of a cone. It is active and often concealed by dense volumes of smoke. The little port of San Juan del Sur is directly in front of it on the coast.

**Madera** is a saddle-shaped mountain, the eastern and higher summit of which has an altitude of 4,681 feet.

Vessels making the land in front of Ometepe and Madera will have the mountains of Costa Rica in sight to the eastward.

From Conseguina point the shore for the first 6 miles, sloping gradually from the base of the volcano Conseguina, breaks squarely off into the sea and forms an almost perpendicular line of cliffs, 200 feet in height. The hills here recede from the shore and 9 miles from the end of the bluffs is a lagoon, or river mouth, with an island across it and shoal ground half a mile out, on which the sea often breaks.

**Speck reef**, consisting of shoal patches with deep water about them, extends 2 miles along the beach and makes out 1¼ miles. At the western end, 1 mile off shore, are several rocks awash.

**Burra Grande reef.**—Between this reef and the shore is a narrow channel with 5 and 6 fathoms, but, owing to shoals, this passage should never be attempted.

**Limon or Bubosa island.**—Evidently the Manzana and False Cardon, of Belcher and De Laplin, and over which the sea often breaks, is low, flat, and covered with trees with small bight behind it full of dangers. It is said that a number of vessels have been lost on Burra Grande reef, or amongst the shoals close to Limon island, by mistaking the latter for Cardon island in front of Corinto. The light-house on the Cardon island and the fact that Limon is densely wooded before it can be made out as an island, while Cardon is comparatively bare, should prevent such disasters in the future.

**Corinto.**—The port is formed by the junction of the Realejo river and the Estero Dona Paula, and extends around the southeastern end of Asserradores island, between it and the mainland on the east and south, and Cardon island on the southwest. It was formerly called Realejo from the village of that name several miles above the anchorage. Asserradores island is often referred to in descriptions of the port, but it should be borne in mind that separated only by a narrow creek it can never be distinguished from the mainland. It is low, level, and densely wooded, with a narrow sand beach along its whole extent.

**Cardon island** is of a reddish brown color, almost bare of trees, about 35 feet high, and nearly level. The northwestern end, known as Cardon head, is faced with perpendicular rocks, and just outside of them is Ponente rock, resembling a tower. As Cardon island is outside of and southwest of the lower end of Asserradores island, and nearly parallel to it, the main entrance to the port, called Cardon channel, is open to the northwest between them.

**Castanon bluffs** are 35 feet high; to the eastward are several wooded hills of twice that elevation.

**Cardon channel** is the only one now used in entering the port. The dangers to be avoided are the rocky patch that makes out to the westward, rather more than 200 yards from the upper end of Cardon island, and Sawyer bank, which extends to the westward from the lower end of Asserradores island, and contracts the channel under Cardon head to a width of 700 feet. A vessel drawing under 18 feet can avoid hauling sharply around Cardon head into the narrow channel, by standing inshore a mile or more northwest of the port until she has the entrance well open to the southeastward. When running in, one of the hills on Pemta Scaco peninsula showing to the left of the light-house should be selected and used as a range, the set of the tides being nearly east and west. The rocks under the light-house can be passed within 50 feet, but it is better to keep 100 yards off as a little helm may be necessary on account of the eddy just inside the head. When directly between Icacos point and the southeastern end of Cardon, steer to pass Icacos within 200 yards. As it is rounded the town will come into view, when anchor in front of it, in 5 or 6 fathoms 300 yards from the shore, and veer to a short scope, or moor.

With a heavier vessel, or when there is any sea on the bar, it will be necessary to keep nearer Cardon island while approaching the entrance of the channel.

When a heavy sea is running it would be unsafe to cross, as there are patches on the bar with only 4 fathoms over them at low water. If obliged to anchor outside and wait for a pilot let go to the westward of the light, where there are from 5 to 8 fathoms within a mile of the shore and gradually deepening.

**The Barra Falsa channel** has deepened since the latest English chart was published, but as there is nearly the same depth now as when surveyed by Sir Edward Belcher in 1838, it is evident that changes are constantly going on. In the spring of 1884 a large French merchantman, mistaking the entrance of the port, ran in through the Barra Falsa, but its use, even with the chart, is not recommended.

The principal danger outside of Corinto is the Conway reef.

**Castanon shoal** has only 3¼ fathoms over it, therefore vessels coming from the eastward should keep 2 miles from the land, or in 12 fathoms, until the reef is passed, and then haul up to pass Cardon island a mile off. The range of Castanon bluffs and the light-house will carry clear of Conway reef, but unless acquainted with the port, it will be difficult to distinguish the bluffs from Cardon island beyond them.

**The landmarks** for making the port in clear weather are the volcanoes of Coseguina, Viejo, and Momotombo; Viejo, owing to its height and position, has been seen by vessels 50 miles outside of Corinto. All the peaks between Viejo and Momotombo are visible from the offing, and as the port is neared, Assoco will come nearly in range with Momotombo and become like it, conical in appearance. For a considerable distance, above and below Corinto, the coast is low, and back of it is an extensive plain rising towards the interior.

The narrow entrance to the port between the bluffs and the southeastern end of Cardon island is called the Barra Falsa.

**The town of Corinto**, situated on the eastern or inshore side of Asserradores island just beyond Icacos point, has a population of 800, and a steady increase seems assured. A railroad through the cities of Chinendega and Leon connects it with Leon Viejo, on lake Managua, and as one is proposed between the cities of Managua and Granada, communication by rail and steamer may soon be established with lake Nicaragua and the Atlantic. During the year 1883 forty sailing vessels arrived from foreign ports and the Pacific Mail steamers stopped on an average once a week.

**The principal exports** are coffee, sugar, hides, dye-woods, mahogany, and cedar.

**Imports**, flour, cotton, and silk stuffs, agricultural implements and machinery.

**Supplies**, except vegetables, can readily be obtained. Water is procured by sailing boats up one of the creeks above the town, or lighters

can be hired for the purpose. Vessels often coal here, but too much dependence should not be placed upon finding it.

**Dues.**—Pilotage, $1.50 per foot. Lighterage, $1 per ton. Custom-house fees $5.25 for discharging, $15.25 for discharging and loading. Tonnage dues 10 cents per ton. Machinery is admitted free of duty. The United States is represented by a consular agent.

**The Tamarinda river** is narrow and tortuous, with less than 2 fathoms on the bar. Occasionally a vessel loading with dye-wood anchors within a mile of the beach, in 5 or six fathoms, and takes on board all that the natives have cut and floated down. It is reported that a schooner once went inside. The best mark for the river-mouth is the Loma de Tigre, a table mountain 8 miles inland, the flat top of which has an extent of 1 mile from north to south and ½ a mile from east to west.

**From the Tamarinda** (cape Desolado) the hills approach the coast, and as the cape is neared they appear in places to rise precipitiously. One and one-fourth miles below the Tamarinda is a rock just awash at low tide, and from this a reef, on which the Bremen bark Industrie must have struck, extends nearly 1 mile, with the depth over it varying from 6 fathoms to less than 1 fathom. None of the rocks lie quite as far out as the one first mentioned.

**Cape Desolado**, the northwestern limit of the gulf of the Papagoyas, is a conspicuous headland, and owing to the low land just to the southeastward appears at a distance to project well into the sea, but in reality the change in the direction of the coast is very slight. The cliffs, ending at the point, are over 200 feet high, and just to the northward part of the ascent is faced by a smooth perpendicular rock, back of which the rise is gradual to the summit of the ridge. The highest point, half a mile inland, when discovered from up the coast, shows several knolls on the seaward slope, and outside of these the headland soon rises. From down the coast the face of the hill towards the interior appears to be steep, the other to descend gradually until near the shore, when it rises and then falls suddenly to the sea. When the cape bears N. 11° E. the Loma de Tigre and the volcano of Momotombo will be in range with it, but neither can be seen when close under the land.

**Gigante**, a remarkable sand bank, heaped up against one of the bluffs, is concealed when approached from up the coast by a projecting cliff, but in front, or from down the coast, it can be seen for more than 12 miles. By moonlight, and when not in the shadow of the bluffs, it is very distinct.

Just beyond Gigante, and 4 miles inland, is a prominent mountain 1,555 feet high, which, from the westward, appears to be capped by a small circular eminence.

The coast in this vicinity is generally bold, some of the cliffs being almost precipitous, but at Brito where there is a slight indentation,

backed by a sand beach, the land is low, and the depression extends through the hills towards the lake.

**Port Nagascolo** is little more than a recess in the cliffs, 1½ miles NW. of the signal station at San Juan. A vessel anchoring just inside the heads would be less than 200 yards from the rocks on each side, and shoal ground less than 400 yards ahead.

**San Juan del Sur.**—Formed by an opening through the cliffs, backed by a curving sandy beach. This port is still further contracted by the shallow water along the edge of the beach, while the entrance is narrowed by the rocky points under the cliffs. The opening of the cliffs to seaward outside of the rocks forms a bight about 600 yards deep. The water deepens gradually from the head of the bay to 5 and 6 fathoms between the rocks, and to 10 and 11 fathoms between the headlands. The bottom in some places is rocky, but generally consists of sand and shells.

The bluffs overlooking the entrance are lofty and precipitous; that on the SE. side projects into the sea, with the narrow ridge at the summit running nearly north and south, and from this the sides and end descend, at first abruptly and then perpendicularly to the water. The signal station, a small square house with a flag-staff near it, stands on the highest point of the ridge and can be seen 6 or 8 miles. A small light is sometimes shown here, but vessels should not depend upon making it when running for the port at night.

The low land back of the bay is succeeded by the foot hills of the dividing ridge between the lake and the ocean, and 2¼ miles from the beach is mount Papayal. When within 15 miles of this mountain a stranger cannot fail to distinguish it by the knolls or mounds along the ridge, the outline resembling that of the left hand closed, with the knuckles uppermost and the palm turned away. When near the port the Frailes can be seen to the southeastward.

**The village of San Juan** stands on the eastern shore of the bay and behind the signal-station hill, but several of the houses are visible to a vessel approaching from the westward. It is 10 miles from Lake Nicaragua and about the same distance from the town of Rivas, with which it is connected by a good road. There is a small well-sheltered wharf for boats and lighters. The Pacific Mail steamers call twice a month going each way, but there are hardly any other arrivals.

**Water and supplies** of all kinds, except beef, are difficult to obtain.

**Exports**, coffee, sugar, hides, and cotton.

**Imports**, manufactured goods, on which 5 per cent. ad valorem duties are paid. Port charges, 10 cents per ton. Lighterage, $1 per ton. The United States is represented by a consular agent.

There should be no trouble in finding the port in clear weather, nor in entering at any time, if the headlands are made. When well off shore the volcanoes of Mombache, Ometepe, and Madera, the peaks of Orosi, and the Cerros Elena will serve as landmarks. When the rocky points

under the bluffs are made, anchor or run past them into the bay. Coming up the coast pass the Bat islands half a mile off, outside of Cape Elena.

The harbor being open to the SW. the Papagoyas blow directly out, and as the squalls are often violent, the bottom shelving, and the holding ground poor, vessels obliged to go inside during the season of these winds should anchor so as to clear the rocks if they drag. When not loading it is better to lie outside, and preferably near the south bluff.

**San Juan to Aranca point.**—The coast is everywhere high and bold, with soundings varying from 10 to 20 fathoms half a mile from the beach. Three miles from the signal station, and 800 yards off shore is the West Fraile, and 1 mile farther, and three-fourths of a mile from the shore, is the Middle Fraile. They are nearly circular, less than 200 yards in diameter, steep sided, flat or oval topped, while 1,200 yards from Cape Natan is the East Fraile, a steep, jagged rock, which, when seen from up the coast, looks like a sloop standing to the southward under all sail except gaff topsail; when in front this islet, owing to the high rock inshore of the same formation, it cannot be readily distinguished. Five miles beyond Aranca Barba point the eastern boundary of Nicaragua is reached. The intervening portions of the coast are included in the shores of Salinas bay.

**Coast of Costa Rica; landmarks for vessels arriving on the coast of Costa Rica between Salinas bay and cape Velas.**—South of Salinas and Elena bays, the coast of Costa Rica, projecting sharply into the sea at cape Elena, sweeps around to cape Velas, forming, by this change in general direction from that of the Nicaraguan coast above, the gulf of the Papagoyas. The line of volcanic action, which presents so many distinctive landmarks in Nicaragua, is prolonged through Costa Rica, but owing to the divergence of the coast line from it, only the mountains near the boundary line are of value to the navigator.

**The Orosi.**—The north and south peaks of Orosi are united by a lofty ridge, which is often visible when the peaks are obscured.

**Rincon de la Vieja**, 8 miles from Gongora, is occasionally active, and its sides, broken and deeply furrowed, differ from the other volcanic peaks of Nicaragua and Costa Rica.

**The Cerros Elena**, a range of mountains, forming a remarkable headland, reach out into the gulf of Papagoyas from the eastward. Seen from the westward, this headland looks like a mountainous island, but from the north or south it shows an oval, serrated ridge, the outline resembling the edge of a half-open fan. Four of the peaks are over 2,000 feet in height.

**Salinas bay.**—This spacious harbor, formed by the doubling back of the coast, which sweeps around with a regular curve to within 2¼ miles of the northern shore, belongs to both Nicaragua and Costa Rica, the boundary line entering near the head. On the north the shore is high and bold, but on the east and south sandy beaches, low marshy

valleys, and bluffs occur at intervals. The peaks of Orosi and the volcano of Rincon de la Vieja overlook the hills back of the bay.

Nearly in the center of the bay is Salinas island, the southern acclivity being much steeper than the northern, and as both appear, when entering the bay, to rise unbroken from the water's edge, it resembles a wedge with the point to the northward.

Except just inside the southern headland, the north and south shore have shallows making out for nearly half a mile, and while there are several ledges with rocks that uncover at low tide, none are outside of this distance. Close to the western point of the Salinas island is a detached rock, and 400 yards from the eastern point there is another with f ul ground 300 yards to the southward.

**Descartes point** terminates the peninsula separating Salinas and Elena bays. Nearly 1¼ miles from it is a rock above the surface, but so small that it cannot be seen at high water until close aboard. A number of dangers were found between it and the point.

The trail from Costa Rica to Rivas and San Juan skirts the northern shore of the bay, and strikes into the hills 1¼ miles east of Aranca Barba point. There is a cattle ranch close to the northern shore and another a short distance from the head of the bay.

**Directions for entering Salinas bay.**—Salinas bay can easily be found, as it occupies the northeastern angle of the gulf of the Papagoyas. Coming down the coast the entrance will be hidden by Cape Natan, the shore apparently continuing unbroken to the head of Elena bay, but as the East Fraile is passed the port will come into view. Arriving from the southward, having passed Punta Blanca at a safe distance, keep cape Elena showing outside of it, and the rock off Descartes point will be cleared; when Salinas island opens from Sacate point, port and run in. If the Orosi mountains are visible, bring the north peak to bear S. 78° E., and stand in on that course. Having entered, pass to the northward of the Salinas island and nearer to it than to the northern shore of the bay, and then, if to get shelter from the westerly winds, stand on towards the head and let go when the island bears north of west, but if the Papagoya is blowing, haul up and anchor as near the north shore as the depth of water will permit.

**Elena bay**, open to the westward between Descartes point and Punta Blanco, is separated by a promontory from Salinas bay. A tongue of land divides the head into two small bays, the southern being known as Juanilla, and 5 miles west of this is another called Port Elena. Except where it breaks at the entrance of Port Elena, the southern shore of Elena bay for 10 miles presents a straight east and west line of high wooded bluffs or steep cliffs that terminate abruptly at Punta Blanco.

Near the north shore of the bay is Despensa island; of its two elevations the southern is the higher and the northern the more abrupt. Two miles farther is another island called Juanilla. Southeast of the latter the depth is convenient for anchoring, but outside of it are sound-

ings to 18 fathoms, deepening to 40 between the headlands. There is a reef between Despensa island and Descartes point, but otherwise the head of the bay is clear of dangers.

**Directions.**—Entering Elena bay from the southward, keep over a mile from Punta Blanca to avoid the rock west of it; with this caution the directions given for approaching Salinas bay, on account of its proximity, will suffice.

**Juanilla bay.**—The tongue of land already referred to which forms this bay is nearly a mile in length, about that distance from the southern shore, and parallel to it. There are two small islands just off the end, and half a mile farther west is a low rocky islet. In the passage thus formed are two dangerous rocks, but the channel between the islet and the south shore, a mile in width, is free from dangers, and therefore a vessel entering should approach from the westward and along the south shore of Elena bay. The bottom is mud and holds well. A small indentation on the south side, called San Tomas bay, affords the only protection from a westerly wind and sea.

**Port Elena.**—This fine land-locked harbor lies in a narrow valley under the Cerros Elena and behind the cliffs through which the entrance leads. The entrance looks like a gorge, and, being the only break in the cliffs east of Punta Blanca, can easily be found. The loftiest summits of the Cerros Elena are farther west towards the cape, but the ridge back of the port is crowned by two conical peaks, that can readily be made out. Just outside the heads are two small islands, Ariba on the east and Abajo on the west, but the latter is so near the cliffs that it cannot always be distinguished when approached from the northward. A small rock will be made as the entrance is neared, and must be left on the port hand going in. In the western angle of the bay a ledge makes out, while from the south shore extend sand and mud flats.

To enter, keep half a mile from the cliffs until the entrance and the islands off it are recognized, when steer between the small rock and the western shore, and anchor anywhere inside.

**Water.**—The natives in the vicinity state that water can always be obtained.

**Punta Blanca.**—This bold and striking headland, sometimes called point Elena, projects to the westward, its rocky sides rising abruptly from the water to the sharp and jagged summit. The ridge it terminates is separated from the Cerros Elena on the south by a narrow valley, which extends eastward and includes Port Elena. Nearly 200 yards outside the point is a small rock 5 feet above water, and nearly a mile west of this is another 2 fathoms under water, with 20 and 25 fathoms all about it. To avoid this danger keep the Bat islands open from cape Elena.

**Punta Blanca bay.**—This bight, though open to the westward, affords a shelter from the papagoyas, and, if it could be reached by a vessel overtaken by darkness when bound for San Juan or Salinas bay,

should be preferred to an anchorage under cape Elena. Three miles above cape Elena and a mile from the shore, are two large rocks, and inside of them is an island.

**Cape Elena.**—Owing to its position and appearance this headland must be regarded as the most striking feature of the coast. It is a narrow rocky ridge, extending into the sea in a westerly direction nearly 2 miles, the sides rising abruptly from the water's edge and meeting sharply at the summit.

**Murciellagos bay** is included between cape Elena on the north and the Murciellagos islands on the south. It was surveyed in 1838 by Sir Edward Belcher, R. N., and the following are his remarks, copied from Imray's Sailing Directions: "On rounding the point in view, corresponding to the point Catalina of Banza, we discovered a cluster of eight islands. These I determined to examine, as they did not appear upon the chart. They almost formed two distinct harbors; the smaller islands forming a crescent by the south, one large island protecting the east and another of similar size forming the line of separation. Passing into the bay, we anchored in the inner or eastern harbor, and having fixed the positions, surveyed it, and completed watering at a very convenient position, where we anchored in 32 fathoms, with a hawser fast to the shore. We found the gulf squalls, even in this sheltered position, come down the gullies with great force, and impede our work as well as endanger our boats. The geological structure of the cape and islands is a schistose-serpentine, containing balls of noble serpentine."

The Ranger anchored several times under the northeastern shore, between the two large islands above referred to, in from 12 to 15 fathoms, but, generally speaking, the bay is unsafe during the season of the papagoyas. On the lee side the islands have 30 fathoms or more close-to, and the declivity of the bottom along the northern slope is so sharp that the anchors do not hold well. The gusts that come down the sides of the mountain are often heavy. As a rule, the papagoyas moderate towards sunset, but this is not always the case.

**San José**, the largest of the Murciellagos, is the third in the chain from the east.

**Colorado** is a large island at the eastern end of the bay, and a little over a mile to the southward there is a low rock with deep water close-to, which is almost connected by a reef nearly half a mile long.

Between the most westerly of the Murciellagos group and the Bat rocks are several dangerous ledges.

The bay is occasionally visited by small vessels engaged in the pearl fishery. There is a spring on Cocine, the next island east of San José. It is doubtful if water can be found there later than February, but 30 yards from the beach and half a mile north of the low point on the main land connected with the eastern end of Colorado by a reef there is a fresh water pond.

**Directions.**—To reach the anchorage from the northward haul close round cape Elena, keep the Murciellagos group on the starboard hand, and, passing to the southward of the island separating the two bays, haul up a little, and anchor under the lee of the land with the west end of Colorado bearing south.

**The Bat rocks.**—The larger of these rocks is about 200 feet in extent and 70 feet in height, with flat top and perpendicalar sides. From it the smaller rock, similar in appearance, though with an opening showing to the southward and northward, is distant 200 yards.

**Caution.**—The ledges to the eastward suggest the existence of pinnacles along the submerged ridge, which the lead failed to find, and as soundings to 55 fathoms, the average depth in the vicinity, can be had close to the rocks the lead gives no warning of dangers, the passage between the rocks and the Murciellagos islands should never be attempted.

**Potrero Grande bay**, open to the WSW. between high hills, widens a little inside but not enough to afford any additional protection to the anchorage. A sand beach curves around the head of the bay, and behind it is a lagoon which receives several rivulets from the surrounding hills, but as they are lost in the marshy ground along the borders while the outlet is obstructed by shallows, vessels should not attempt to water here. A number of rocks show above water close under the heads, but there is no danger outside of them.

**Huero bay and islands.**—The bay is a small inlet, open to seaward, while the two islands on the north side lie so near each other and the shore that they appear to be high wooded bluffs on the mainland.

**Port Culebra**, the finest harbor in Central America, is spacious, secure, and easy of access, with water sufficient for the largest ships. The entrance, open to the southwestward and looking down the coast, is a mile wide, while the shores are steep-to, and the water shoals very gradually towards, the head of the harbor, over a bottom of mud and sand.

From Buena point the coast outside sweeps around to Cacique point, and then makes a deeper curve, forming Cocos bay, open to the NW. between Cacique and Miga points. Off Cacique point are three small grass-covered islands, called the South Viradores, the outer one nearly mile from the shore. Being fairly well defined against the wooded hills behind, they serve as marks for Port Culebra and Cocos bay. For vessels approaching from the northward a more prominent mark is the North Viradores, a flat, rocky islet just above the surface, with a rocky column near the center. It will not be so readily discovered when coming from the westward, owing to the lack of vegetation on the steep face of Mala point beyond, in which direction lies another low, rocky islet.

Port Culebra and Cocos and Huevo bays were surveyed in 1838 by Sir Edward Belcher, R. N., and his chart still answers well all purposes of navigation. He says: "Water fit for consumption was not found at the beach, but may be obtained a short distance up the creek, which a boat may enter at high water. Brazil wood is very abundant." As people are principally employed cutting the Brazil wood, probably all the mahogany and cedar which formerly grew near the beach has been hewn and shipped.

Making Port Culebra from the northward, having rounded cape Elena and the Bat rocks, steer S. 56° E. until the Viradores are made, when bring the pillar rock a little on the port bow and run in between it and the South Viradores, hauling up to the eastward, around the rock, and so in through the entrance. Approaching from the westward, or from down the coast, having made Santa Catalina island, above cape Velas, and run by, keeping outside of it, past Brumel island and Gorda point, and then along the shore. The South Viradores will soon be made out under the land, with the entrance beyond and a little to the left, and the anchorage will be reached with hardly a change of course.

If intending to anchor in Cocos bay, bring the South Viradores about east, and run to within a mile of them, or until a long low building at the head of the bight can be seen, when steer in, keeping a little nearer Cacique point, as there are several ledges near the southwestern shore, and anchor in 8 fathoms.

**Brumel island** is covered with grass and bare of trees; its shores are steep and rocky and near the eastern end is a deep hollow which extends across and, when bearing S. 45° E., has the appearance of two islands. On both the north and south sides the bottom is foul, but the extreme end is clean and no dangers were found in the channel behind the island.

**Santa Catalina island**, an important landmark and one not easily mistaken, in reality is two islands, the opening being seen when bearing N. 45° E., but as they never have been so considered and any unexplained reference might serve to perplex rather than to aid the navigator when he sees them for the first time, they will be described and referred to as Santa Catalina. On every side a perpendicular wall of rock rises directly from the sea, and as the sloping face is covered with sacate, the resemblance to a stone fortification with turfed parapets is striking. The highest point of the island is 231 feet; the depth close-to is nowhere less than 20 fathoms, while to seaward it increases in less than a mile to 35 fathoms. A bank extends 2½ miles to the southeastward, shoaling to 15 fathoms, and making with the coast a wide, 20-fathom channel.

**Caution.**—Scattered over this bank are several groups of pointed rocks that rise above the surface. Vessels should give these rocks a wide berth, never venturing inside of a line from cape Velas to Santa Catalina island, except to run through the channel referred to.

**Protrero and Braxilito bays**, open to the northward and westward, are in the angle of the coast between Brumel island and cape Velas and behind the bank southeast of Santa Catalina island. They are simply curves in the shore, separated by a high, wooded point, nearly a mile in length, and an island close to its extremity.

**Protrero.**—The northeastern bay along the eastern shore has several small islets, and near the head a shoal patch with rocks awash. A small house, the only one in the vicinity, stands on the beach near the eastern angle of the bay, and a line through it from the middle of the island between the two bays passes over this shoal. When going in keep on the southwestern side and anchor where the depth is suitable as the water shoals in gradually from 15 fathoms.

**Braxilito.**—The southwestern bay has soundings which diminish regularly from 16 fathoms, midway between the points of entrance, to 6 and 8 fathoms, half a mile from the shore, but inside this distance they are irregular, and on each side 800 yards from the shore are rocks under water, or part awash, 800 yards off. If intending to anchor within half a mile of the beach, do not allow the island between the bays to shut out the point of land back of and nearest to Brumel island, nor any of the group of rocks to close in with Santa Catalina island; by keeping between these ranges the dangers on each side of the bay will be avoided.

Ships loading on the coast with dye-wood, cedar, and mahogany, visit these bays occasionally. The streams do not probably long outlast the rainy season.

While the outlying bank does not prevent the sea from rolling in, the waves are more or less broken by the rocks, and these bays may be regarded as tolerably secure anchorages. Vessels may use either entrance to the channel leading in. From the northward run in between Brumel and Santa Catalina islands and steer so as to pass to the eastward of a small black rock, showing but little above the surface at high water. When on the range beeween Brumel island and cape Velas the rock will be past, and the point separating the two bays being a little on the starboard bow the course can be maintained into Protrero bay.

**Landmarks for vessels arriving on the coast of Costa Rica between cape Velas and the gulf of Nicoya.**—The mountains are of moderate elevation and to a vessel in the offing they present few peculiarities of outline, but upon a nearer approach the Cerros de San Blas will be made out above Guionos point, or Split peak, north of cape Blanco.

**The Cerros de San Blas.**—A short mountainous ridge, 8 miles from and parallel to the coast, can easily be made out, as it is so much higher than land between it and the gulf of the Papagayos to the westward. The cone-shaped summit of mount Boughey will be seen a little farther down the coast, and between it and Split peak the coast range shows several points of equal elevation with no particular way of distinguishing them.

**Split peak** takes its name from the cleft which is distinctly visible from the westward and divides the summit, the south point being the higher. It rises north of the plateau behind cape Blanco and as it exceeds in altitude any of the peaks to the gulf of Nicoya may be regarded as the eastern termination of the Coast range.

**Cape Velas** is at the southern limit of the gulf of the Papagoyas.

**Morro Hermoso** rises immediately behind cape Velas and, making an important turn of the coast, looks like an island when first seen from the southward, and is often the first point rocognized by vessels entering the gulf of the Papagoyas when well over to the eastward. The sides have a regular and gradual slope, and the short narrow ridge running east and west has a slight depression, which gives it a saddle-shaped appearance; the eastern summit is round and the western sharp. Back of Morro Hermoso are several hills of greater elevation, and when approached from the westward will first be noticed as a conical hill under them.

Between San Francisco point and Guionos point detached black rocks will be found in many places, but, with the exception of these and shoals in the vicinity of Guionos point, there are no dangers over half a mile from the shore.

**Guionos point** from above and below shows a wooded hill with a gradual descent to the edge of the cliffs that overhang the sea. A rocky reef, making out from the point to the westward, uncovers at low water, and at all times the sea breaks over the mass of rocks at the foot of the cliffs. A little distance below the point the bluffs with bare precipitous faces are crowned by several wooded knolls. There are a number of dangers to navigation off this point, made serious by the great depth of water close to them, and by the NW. current which here reaching its maximum runs in the winter at the rate of 2 knots an hour. Two and three-quarters miles from the point, and 2 miles from the shore, is a sunken rock, with 20 fathoms just inside of it, and 50 fathoms within 2½ miles. A little more than a mile distant is another rock, under water, with 15 fathoms close to it and 50 fathoms within 1¼ miles. In calm weather the sea breaks over these rocks only at long intervals. There are other dangers in the vicinity of the point, but none of them are outside of a line between the two just described.

**Pierdra Blanca bay.**—From the westen point a reef of rocks extends SE. half a mile, leaving an entrance to the southeastward between the end of the reef and the extreme point of the bay. A vessel entering should keep close to the land on the eastern side, and in anchoring should let go far enough over to the westward to swing clear of a sunken rock nearly 600 yards from the extreme point of entrance. The water shoals gradually from 10 fathoms. The best mark for the bay is a large whitish rock 1,100 yards off the outer end of the reef on the western side of the entrance.

**Quinonos point**, the extremity sharp and rocky, projects slightly into the sea to the westward.

**Musimillama point** is similar to Quinonos point.

**Cape Blanco** is one of the most striking landmarks on the coast, especially when approached from the westward. Back, or north of it, a lower plain succeeds, which stretches to the foot-hills under Split peak, and while this remains below the horizon the more elevated plain resembles a long level island some distance from the land. Every other headland on the coast is irregular in outline, and Cano island (south), which alone can be said to resemble it, is so near the coast to the eastward that a mistake would be impossible. From the brow of the cliffs at the southern end of the plateau the distance to the extreme point of the cape is a little more than a mile.

**Blanco island**, oval in shape, is a mass of whitish rock, rising abruptly on all sides, with a small patch of scanty vegetation at its highest point; and though no dangers were found near it, the use of the channel between it and the point is not recommended.

# CHAPTER VII.

## FROM THE GULF OF NICOYA TO THE GULF OF DULCE.

**The gulf of Nicoya.**—On the eastern side, at the narrowest part, and where the direction changes to the westward, is Punta Arenas, the only port of entry. The gulf was carefully surveyed in 1838 by Sir Edward Belcher, R. N., and an examination made in 1885 showed that few changes have since taken place.

The islands, with the exception of Chira, are small, and as they lie along the western shore, slightly detached from it, vessels navigating the gulf pass to the eastward of them.

**Sail rock.**—With light or variable winds sailing vessels should avoid getting too near this rock, as the tide runs past it with considerable force and the depth is too great for anchoring.

**Avis and Pan de Azucar (Sugar Loaf)** are small but conspicuous islands. Pan de Azucar is sometimes resorted to by vessels for shingle ballast, the anchorage being on the west side.

**San Lucas island**, with a small but secure harbor, on the northwest side, was a few years ago made a convict station by the Costa Rican government, and communication with it is forbidden.

**West coast.**—It has already been remarked that the ordinary track of vessels lies to the eastward of the islands, and as the western shore of the gulf borders on an uncultivated and almost uninhabited region, it is seldom visited. Between cape Blanco and the Nigretas islands the soundings increase rapidly off shore, but 3 miles above the cape a rocky reef, marked by a flat circular islet, makes out. Above the Nigretas, and as far as Venado island, the depth is convenient for anchoring, but between the latter and the head of the gulf extensive shallows are found.

**Ballena bay.**—Having rounded cape Blanco and brought the western shore and Jasper island into view, Ballena head, a bold conspicuous promontory will be made out, and upon nearing it, Ballena bay will open between it and several wooded hills to the southward. A low sand beach, broken by several entrances to the estero behind, sweeps around the head of the bay, and scattered along it, just above high water mark, are a few native huts. The water shoals regularly over a hard sandy bottom. Running in, it is only necessary to keep half a mile from either point.

**East coast. Judas point** is the western headland of the gulf, and only the breakers on the reef serve to mark it in front, but from either

side, when near the land, a wooded eminence will be made out above it, having a steep ascent at first, and then rising gradually to the highest point, ¼ of a mile inland.

**Judas reef** makes out from the point in a southwesterly direction, and shelving slightly and partially uncovers with the tide; the sea at all times breaks over detached rocks that show here and there above the surface. Vessels passing should keep at least 2 miles from the shore, and when just off the reef will have at that distance soundings in 10 and 12 fathoms. The existence and direction of a submarine ridge is indicated by this reef.

**Cano island**, lying close to the land and connected with it by a reef bare at low water, is a prominent mark for vessels coming up the coast, appearing as a bold and lofty headland to the left of the Herradura mountains. It is a narrow, rocky ridge, perpendicular in direction to the line of the shore, the sides rising abruptly and terminating sharply at the crest.

**Port Herradura.**—Open to the westward, between Cano island on the south and Herradura point, a steep and rugged headland on the north, is rarely visited, communication with the interior being virtually cut off by the mountains that hem it in, while a sunken rock, nearly in the centre, impairs its advantages as a port of refuge and an anchorage at the entrance of the gulf. The water is deep between the heads and the soundings are irregular for some distance inside, but near the beach across the head of the bay, and a little below the mouth of a small stream that affords an abundant supply of fresh water, the anchorage is good.

**Havannah rock.**—The danger above referred to was correctly located in 1856 by T. A. Hall, master R. N. The remark "breaks at half tide," appears upon the chart made from his survey, but as the officers of the Ranger never saw it break, even at low water, and as Belcher failed to discover the rock when he surveyed the bay in 1838, vessels running in, with the ordinary conditions of wind and sea, should depend upon bearings to avoid striking it. Along the northern shore of the bay are numerous detached rocks.

**The village of Agujas**, above Sucia point, contains about thirty houses, and will be known by two detached light-colored rocks to the northward. Outside of the beach in front of the village is a ledge that uncovers at low tide, and beyond this the water soon deepens to 20 and 25 fathoms. The natives land at high water and haul their boats into the basin at the mouth of the creek south of the village.

**Calderas bluff** is high, steep, and covered with trees. In the northern portion of the bight it forms, and within 1 or 2 miles of the beach, the depth is not too great for anchoring.

**Punta Arenas** (Sandy point) is not only the only single port of entry in the gulf but the only place of any importance on the Pacific coast of Costa Rica. The channel leading up the gulf is to the westward of Punta Arenas bank, which makes out from the western end of the

peninsula. The outer anchorage, or roadstead, is on the eastern side of the bank and in front of the town, but as far east as Calderas bluff or the Baranca river the depth is convenient for anchoring. Though open to the entrance of the gulf, some protection is afforded from the rollers by the Nigretas islands. The inner harbor, or the estero behind the town, is land-locked and perfectly secure, but the depth on the bar at low water is only 1¼ fathoms, and a pilot must be taken if intending to enter.

**The town** is regularly laid out and has a population of about 2,000. The light-house, whose white tower rises a few feet above the adjacent buildings, is near the beach to the westward, but the light cannot be depended upon, as it is often fainter than the stay-lights of ships at the anchorage. A little to the eastward of the light-house is a fine iron pier at which lighters discharge vessels lying in the roadstead, but the water is said to be shoal about it, and in 1885 the end hardly projected beyond the line of the surf.

The trade of the port has of late years greatly declined; San José, the capital, being now connected by rail with Port Limon on the Atlantic coast, while the construction of the Pacific division of the road seems to have been indefinitely postponed after the few miles between Punta Arenas and the village of Esparta were completed. The Pacific Mail steamers call twice a month going each way, and a small steamer makes regular trips to and from the villages on the Tempisque river. Coffee is the principal export, but there is some trade also in hides, cedar, mahogany, and dye-woods; manufactured goods of various kinds are imported; tobacco, gunpowder, and saltpeter are admitted only on government account, and rum and fire-arms only by special permission; mails arriving are first sent to the capital and then returned for distribution; fresh provisions and good native potatoes are plentiful and cheap; water is obtained from the Baranca river, advantage being taken of the tides. Lighterage, $1 per ton; pilot charges for entering the inner harbor, $1 per foot.

The United States is represented by a consular agent.

**Directions.**—The entrance of the gulf is marked on the west side by Blanco island and the plateau back of Cape Blanco, and on the east by the termination of the mountain range that overlooks the coast below; the last spur, known as the Herradures mountains, rising abruptly from the eastern shore of the gulf.

**Mount Turnbales**, showing over the Herradura mountains when off the entrance and to the eastward of them from down the coast, is a prominent peak with a small conical summit; 2½ miles east of it is a mountain with a flat top nearly half a mile across. Twenty miles farther east are mountains of still greater elevation.

The entrance to the gulf of Nicoya is so wide that no difficulty whatever is experienced in making it. It is usual to steer for cape Blanco, keeping a little eastward of its meridian, and afterwards to direct the

course into the gulf; but it appears probable that some advantage would be gained if the land about Port Herradura were made instead of the cape, as the effect of the westerly current would thereby be to some extent neutralized; a mile or two would also be saved in the subsequent route to Punta Arenas.

Having entered the gulf keep along the eastern shore, as it is shallower than the opposite coast, and also because the effects of the ebb stream, which, south of the Nigretas islands, flows in a southwesterly direction, will not be so strongly felt. The soundings, although great, are not so deep but that the anchor can be let go in the event of being overtaken with a calm and a contrary current. The flood has occasionally considerable strength, and requires to be guarded against as its tendency is towards the Nigretas islands, in the vicinity of which the water is very deep; close to the south side of the Sail rock the depth is 24 fathoms, deepening rapidly seaward to 36 fathoms. The course hence to Punta Arenas is direct, and by keeping the light to the eastward of N. 22° W. vessels will be clear of all danger until the anchorage is reached. Both ebb and flood set strongly over the Punta Arenas bank.

In a steamer, having rounded cape Blanco at a distance of 1 mile, if bound into point Arenas, steer for Sail rock. If at night, pick up Jasper island, which is higher than the Nigretas; and if very dark be sure and give Sail rock a berth, as it is not very high and cannot be seen far. If the light is made after passing Sail rock, bring it to bear N. 22° W., run for it and anchor in 5 fathoms, sandy bottom. If, however, the light is not made (and it cannot be depended upon) run over and make Calderas bluff, and then coast along in 6 fathoms until off the village; anchor in 5 fathoms. When off Calderas bluff, with the light bearing N. 65° W., 7 fathoms water, a bluff point will be seen and to the right two remarkable hillocks. The light is inside of the point and (on this bearing) to the right of the hillocks. As the hillocks are approached they appear to the right of the light.

This is the best mark for picking up the anchorage when the light cannot be seen.

By running close to Calderas bluff, and then coasting it, the shoals will be avoided, and if there are vessels here they will show clear of the point. These hints are only intended for night, as by day there is not the slightest difficulty in making this port. In the daytime run for the end of the wharf a little to the right of the light-house.

In running for the port from the eastward pass Cano island (the SE. island of that name) 2 miles distant, and steer about N. 45° W. for Cano island No. 2. At a distance of 30 miles, by day, if the weather is clear, Cano island will be seen lying off a high mountain, and at the same time point Mala or Judas, a low point under the mountain, will be seen to the right. About this time point Quepós will be abeam, distant 20 miles; this point looks like a saddle and is easily recognized. High land a little on the port bow, and, perhaps, cape Blanco broad off

the port bow, will be seen. If a dark night do not try to make Judas point but keep on until the point off which Escollo rock is marked, called point Guapilo, by Imray, is seen. This is a bold, high bluff, and readily known. Cano island is the best mark for the anchorage. It is bold, and cannot be mistaken; when abeam it resembles a haystack.

After this comes Herradura point, and still to the left point Sucia.

Having passed Cano island and hauled up as directed, run until the light is seen, which will be at a mean distance of 6 miles, or if it is not seen run for Calderos bluff and proceed as before.

In the dry season there will be many fires on the land; be careful not to mistake them for the light.

**Tides.**—The tides at point Arenas are regular. The flood sets NE. and N. from Cape Blanco, then NW. and at the anchorage west; the ebb runs in contrary direction. It is said that off Herradura point the flood sets over to the westward, probably NW., while on the western shore it sets into the land. Strong tide-rips off Sail rock will be found. Always calculate the time of high water at point Arenas when bound there, so as to know the set in going up the gulf.

When coasting along from Calderas bluff in 5 or 6 fathoms of water, and no lights are seen, be careful not to pass the light-house, as there is danger of running on the shoal. Pass Cano island 2½ miles distant, and when Herradura is abeam steer N. 16° W.

When in doubt anchor and await daylight.

**Chira island anchorage.**—Nearly all the dye-wood and other Central American woods exported from the gulf are cut on the banks of the Tempisque river and its tributaries and floated down to Chira island, where vessels loading anchor in 5½ fathoms water, half a mile from the northeastern shore of the island.

**The Tempisque**, a sluggish muddy river, empties into the gulf at the head, 6 miles above Chira island. It is navigated by a small steamer from Punta Arenas as regularly as the tides admit; high water being taken advantage of, both for crossing the mud flats below the mouth and for ascending the river.

**Judas point to the Vieja river**, the land immediately back of the beach is low, and the ascent towards the mountains in the interior, for the first few miles, is gradual. Vessels can anchor anywhere as there are no dangers over half a mile from the shore; and the soundings diminish regularly.

**Quepos point**, bold and prominent, at the western end of a line of densely wooded bluffs, rises abruptly from the shore to the eastward. Near the point and to the northward of it are a number of outlying rocks.

**The Quepos group**, with the exception of one wooded island east of Naranjo point, consists of a chain of bare, detached rocks. No hidden dangers were found in the vicinity, but it would be prudent to keep more than half a mile to the southward when passing. Should the land

hereabouts be sighted in thick weather the rock to the southward of of Naranjos point can easily be recognized, as much of its surface is of a reddish color.

**Uvita bay.**—Southwest of Uvita point, and connected with it by a sand spit that uncovers at half tide, is a small circular island, also called Uvita, from which the rocky reefs make out, one in a westerly and the other in a southeasterly direction, the whole resembling in form the letter Y. Behind the hook formed by the point, the sand spit and the southeastern arm of the reef, is Uvita bay, and as the coast a few miles below sweeps around to the southward it affords a tolerably secure anchorage during all winds.

**Ballena island**, a mass of whitish rock, shows distinctly against the wooded slope of the mountain behind it, being often mistaken at a distance for a cliff or hill-side left bare by a land slip. Coming from the southward or southward and westward three points of equal elevation will be seen, while from the westward there are only two. The Ballenitas are three pointed rocks near the shore and 1 mile east of Ballena. There are many sunken rocks in this vicinity and therefore access to the anchorage at Uvita, except by the channel already referred to, is cut off.

The bay, formed by the sand spit and the arm of the reef making out to the westward from Uvita island, has a number of sunken rocks off the entrance, and is exposed to a westerly wind and sea. The reef has several openings through it toward the outer end.

There are two or three huts on this island that can be distinguished several miles, and as there are no others near the shores of the bay they serve to mark the anchorage and the position of the reefs.

From Uvita point the sand beach, with a strip of low land to the mountains, curves around 2 miles to the southward and eastward ending at the foot of a bluff. Fresh water can be obtained from two small streams that enter the bay near the anchorage; the one farther from the point flows, from a pool 10 to 12 feet deep. where casks can easily be filled and rolled across the beach.

**Guajumal bay**, above Violin point, is shoal, and the low coast north of it must be approached with caution, especially off the river mouths, as the soundings diminish suddenly inside of 15 fathoms.

**Violin point**, which is steep and rugged, has several small wooded islands so close under it that they can only be made out clearly when approached along the coast.

**The Secate islands** are two flat rocks so close together that they generally appear as one. It would be prudent to keep a mile to the westward of a line between them and the Violin islands.

**Sierpe bay** is a small shallow inlet south of Violin point.

**Llorena point**, being at the termination of a well-wooded plain, can be easily distinguished over 15 miles; upon getting nearer a number of red patches on the face of the cliffs will be seen amongst the trees.

One mile below the point there is a little waterfall, with a descent of nearly 100 feet.

**Reef.**—The coast between San Pedro and Llorena points is bordered by a rocky reef, along which a number of islets rise, the largest called San Pedro island, and another, close to it, being marked by trees that resemble umbrellas. At the upper end of the reef only low, black rocks are visible, but near Llorena point the islets are high and wooded, like the bluffs from which they have evidently been detached. The face of the reef is comparatively clean, and vessels will avoid all danger by keeping a mile from the shore.

**Cano island (South)** rises on all sides with a steep ascent and is so nearly level that when first discovered the appearance of the trees along the horizon would indicate low and marshy land rather than an elevated plain 20 miles away. The shore is lined with rocks, but with the exception of two that are 1 mile from the southeastern point of the island, none of them lie more than 600 yards off, and outside of this distance the soundings deepen rapidly to 10 and 15 fathoms. The best water for anchoring is northeast of the island, but in no case should a vessel go inside of 15 fathoms without sending a boat ahead.

**Corcovado rock** is dome-shaped and 60 feet high. No dangers were found outside of it, but from the nature of the bottom, as indicated by the pointed rocks to the eastward, it would be prudent to keep a mile off in passing, or in not less than 12 fathoms. The shoals between it and Sal-si-puedes point will be cleared if, in running down the coast, the vessel is kept to the southward of the range of Corcovado rock and Llorena point until you have Chanca-pelona rock off Sal-si-puedes point, bearing E., and, conversely, Chanca-pelona rock must be kept to the northward of E. until the range of Corcovado rock and Llorena Point is crossed. Losing the wind and drifting with the current, which sometimes sets to the northward and westward 1½ knots an hour, and, as the depth is not too great, it is best to anchor.

**Sal-si-puedes point** is high, and will be easily recognized from above or below by a natural terrace back of it. A reef, with rocks above water and swash, makes out from it 1,200 yards to the southward and westward.

**Chanca-Pelona** is a circular, flat-topped rock, outside of which the soundings deepen in 2 miles from 10 to 120 fathoms.

# CHAPTER VIII.

## FROM THE ENTRANCE TO THE GULF OF DULCE TO PANAMA.

**The gulf of Dulce** is seldom, if ever, resorted to by merchantmen, and unless the development of the Central American states is hastened by the opening of an inter-oceanic canal, it will hardly be considered in the commercial world for many years to come. At present not more than 400 people inhabit its shores. The upper and larger portion is a remarkable basin, with an average depth of 100 fathoms; therefore its navigation by sailing vessels, in the season of squalls and calms, must be attended with some risk.

**Cape Matapalo**, the western point of entrance, is high, steep, and covered with trees. Under it and just off the extreme point is a conical rock that stands out prominently as the entrance is approached from the westward.

**Matapalo rock** is dark, and vessels must keep at least one-quarter of a mile outside of it on account of the ledges near it, and a sunken rock midway between it and the shore.

**Punta Arenitas.**—Behind the point and just above the mouth of a small creek that enters from the southward, is the village of Punta Arenitas, or Santo Domingo. The population of about 200 is made up of half-breeds, Indians, and negroes, but as this number is increased whenever political disturbances occur in the States of Chiriqui and Panama, the chance of obtaining fresh provisions is correspondingly diminished. Bullocks, poultry, and fish can generally be purchased at reasonable rates, but the wells are only sufficient to supply the inhabitants, and vessels short of water will have to send their boats 3 miles above the anchorage, to the Tigre river.

The anchorage above the point is between the mud flats in front of the village and the deep water to the northward, but SE. of the point and below the coral reef there is a broad shelf, on which the anchorage is also good.

Punta Arenitas is 10 miles inside of cape Matapalo, but as the old chart represents the distance as nearly 16 miles, vessels using it must be careful not to mistake the sand bars at the mouth of the Tigre river for the beach. Only two or three houses can be seen from below the point, and even after it is turned the village is not easily distinguished against the woods. Except in thick weather the anchorage can be easily found by the marks on the opposite shore near Golfito. To avoid

any mistakes regarding these marks note them when you are running up the gulf and pass between them and cape Matapalo.

If intending to anchor above the point run on, keeping over half a mile from the beach, and when you have the end of the spit bearing to the southward of S. 45° W. you will be past the upper end of the coral reef and can steer in for the anchorage in front of the village. The mud flats make out nearly 300 yards, and a quarter of a mile farther out the soundings are 20 and 25 fathoms; therefore the lead should be kept going and the anchor let go whenever a cast gives 12 or 15 fathoms.

**Tigre point.**—The Tigre river discharges here and boats can fill with fresh water from a small stream that joins nearly a mile above the mouth.

**El Rincon.**—One-third of a mile from the head of the gulf a low point, covered with trees, projects half a mile from the southwestern shore; the little bay behind affords the only secure anchorage above Golfito. From the end of the point a sand spit runs out 200 yards, but while part of it is above high-water mark the depth is 20 fathoms just outside. The Rincon river falls into the bay here and at low tide the water is fresh nearly to the mouth. There are three or four huts on the northern and western shores with a little cleared land about them, but only bananas and plantains are raised. The bay is surrounded by the spurs of the Sierra Sierpe.

As the shores gradually approach each other it is only necessary in making the anchorage to keep midway between them, and when the point and sand spit are made out, to round the latter at a safe distance

**El Rincon to the Esquinas river.**—Bluffs of moderate elevation rise abruptly and the shore is indented by several small bays where the water is shoal enough in places to anchor, but vessels without a chart should not attempt feeling in with the lead, as some of the reefs have 50 fathoms close to their edges. The islets marked on the chart show distinctly against the bluffs and will assist in finding an anchorage. The valley of the Esquinas is a mile wide, and across the end are mud flats and sand bars that choke the several mouths of the river and make it difficult even for boats to enter.

**San José** is the name given to several cattle ranches that occupy the small patches of level ground between the bluffs just above San Juan point.

**Golfito** is a fine land-locked harbor opposite Punta Arenitas. The entrance, open to the southward and westward, leads into the northwestern end of the bay. On the peninsula, south of the entrance, is a wooded hill 860 feet high, and, as the coast to the northward is high a d abrupt, the entrance looks like a canyon or mountain pass. South of this hill the land is low and flat, and here the southeastern end of the bay is separated from the gulf by a narrow neck. Still farther south there is another hill, similar in appearance but more conspicuous to vessels com-

ing up the gulf, as the coast below it is comparatively flat for several miles. Behind the bay is a steep ridge, with a conical eminence near the northwestern end, called Adams peak.

Golfito was surveyed in 1852 by Captain de Laplin, of the French navy, and again in 1880 by the officers of the U. S. S. Adams, Commander J. A. Howell, but while its advantages have been understood, a permanent settlement has never been attempted. Three or four families live here, but nothing in the way of provisions can be obtained, and though several streams fall into the bay there is no place where a vessel can conveniently water.

The coast below is bordered by a shoal that makes out from one-half to 1½ miles, with from 20 to 50 fathoms just outside; therefore a vessel running up the gulf should keep well off the shore until she has the entrance bearing N. 45° E. Steer in on that course, and when in the narrowest part, nearly ahead and against the woods beyond, a low island will be seen. It is covered with mangroves, and is connected with the sand beach on the starboard hand by a bar that uncovers at low water. When the island bears from S. 45° E. to S. 45° W., anchor. Soundings 6 to 7 fathoms, mud bottom. On the north side of the entrance the shore recedes, but a 2½-fathom shoal makes out from it and contracts the channel.

A vessel drawing over 15 feet, and not provided with the harbor chart, should wait for high water, or send a boat ahead to mark the end of the shoal on the north side of the channel. On account of the great depth of water outside the entrance, and the shoal coast to the southward, the lead cannot be depended upon when the landmarks are obscured; therefore vessels should anchor above Banco point, and wait for the weather to clear.

**Coto river.**—The shoals at the mouth make out 1½ miles, and most of them uncover at low tide, leaving two narrow passages with less than one-half a fathom in them; one along the northern shore, and the other leading across north a little to the left of a hut on the south bank. The sea generally breaks on the bar, and as sharks are numerous, the attempt to cross is attended with considerable danger. Outside the shoals the water deepens at once to 30 and 40 fathoms.

**Banco point** is not very prominent, but as the entrance is neared it will be made out at the foot of the northwestern slope of Platanal head. There are a few detached rocks about it over which the surf breaks, and vessels passing should keep half a mile off, where they will have soundings in 9 and 10 fathoms.

**Platanal head** at a distance appears to mark the eastern side of the entrance.

The gulf is in the projection of the coast between Llorena and Burrica points, and navigators without observations for several days, and missing the entrance on either side by 30 miles, would know by the direction of the coast their position with respect to it. When in the offing

the Cerro Sal-si-puedes is the best mark, as it rises abruptly at cape Matapalo and runs northwesterly 15 miles, gradually increasing in altitude. Rounding Burrico point 25 miles to the southeastward of the entrance Platanal head will easily be distinguished. Entering the gulf at night, the most convenient anchorage is in Pavon bay. Should it be blowing heavily from the SW., having run inside the heads 2 or 3 miles, you may steer about N. 33° W. for an anchorage, as the lead will give you 10 and 12 fathoms over a mile from any danger. The report concerning the great depth of water along the western shore south of Tigrito point proves to have been incorrect. Running in from the westward at nightfall and being anxious to keep hold of the land, be careful not to mistake the rock just off the cape for Matapalo rock.

**Burica point** marks the boundary between Costa Rica and the United States of Colombia, and, being at the extremity of the peninsula southeast of the gulf of Dulce, with a group of hills back of it, looks like an island when first seen by vessels approaching along the land.

In its vicinity the flood tide sets NW. with some strength.

Between point Burica and Parida island the coast, receding, forms a large bay, within which are no dangers, and the shore in the east part consists of low islands, forming the delta of the David river. In all this bay there is no sheltered roadstead, nor does it possess any advantage which would make it a resort for vessels. The principal entrance to the river is the boca San Pedro, which is impracticable for vessels, and about 20 miles up is the city of David.

**Sevilla island** abounds in game, which can be obtained with facility.

**Parida island**, of irregular shape, is well wooded, while rivulets afford and abundance of fresh water. Numerous islands (the largest Balano), and among them many sunken reefs, are scattered about on the east and southeast sides to a distance from 3 to 4 miles, making the approach to David bay from SW. of some little risk. The only commodious anchorage near Parida island is at its NE. end, under the protection of an island which affords shelter from southward in 6½ fathoms, mud bottom. If this anchorage be approached from seaward, steer for and pass Viuda rock, on the west side, at a distance of about 1½ miles, then direct the course for San José islands; leave these islands to the northward and steer for the north end of Parida island, keeping in from 7 to 8 fathoms but decreasing to 3½ fathoms as the anchorage is approached; when it deepens again to 6½ fathoms anchor. At this end of Parida plenty of good water will be found. At the SW. end is a small bay called Chimmo, in it is from 2½ to 10 fathoms. In front of the bay is a small islet called Santa Cruz. The passage in is north of this islet. The lead should be kept going and a good lookout for any sunken rocks. Good water can be obtained here. From David bay vessels can pass either on the west or south sides of San José island.

**Caution.**—When sailing around the SW. point of Parida island it should be given a berth of about a mile on account of some sunken rocks

half a mile from it, which have a depth of 15 and 16 fathoms close to them.

**David bay**, so named from the river which falls into it, is included between Juco point and the island of Parida. In it are numerous rocks, but with the chart an anchorage can be selected without much difficulty. About a mile SW. from the point are two islets named Monitas, connected together and surrounded by a reef, the southern of which has a close resemblance to a saddle.

**Viuda rock.**—Two and a half miles S. 11° W. from these islands is an isolated rock named Viuda, having a reef extending from it about half a mile. As this reef and rock are both steep, with soundings of 10 to 12 fathoms close around, they require great care to avoid. It is said that to vessels approaching David bay from southward, Viuda reef may be known by breakers; however, this is a very formidable danger. In the middle of David bay is a dangerous rock—El Buey—which is only visible at half tide, and for which no well-defined landmarks can be given. Its extent is small and the soundings close to it are 5 to 7 fathoms.

The channel between Monitas islands and Juco point is not considered safe, though the depth is 7 to 8 fathoms; hence vessels seeking anchorage in David bay steer for San José island and generally pass to the southward of these islands, between them and Viuda, or between the latter and the islets off the east side of Parida islands. Vessels can approach the islands within a moderate distance if ordinary precaution be taken to avoid undiscoverable dangers and anchor about midway between them and the Monitas.

**San Lorenzo bay.**—Vessels should avoid entering this bay, which is near point Juco, as it is full of sunken rocks. There is a village a few miles up the San Lorenzo river.

From Benado islands to Espartel island the coast is clear except the rocks off Red hill.

**Pueblo Nuevo river.**—The entrance is south of the islands and between them and point Cayado. The best time to enter the river is during the flood and with the wind from the seaward. The channel between the two large islands is shallow and can only be used by boats at high tide.

**Provisions** can be obtained at the village of Pueblo Nuevo.

**From Pueblo Nuevo to Bahia Honda** the coast is free a short distance off shore. The coast line is very irregular, and forms several bays, of which Monita, Rosario, and Pajaro are the principal ones, though all of them are exposed to winds from the westward.

**Bahia Honda** affords shelter from all winds and a berth can be selected in almost any part of it. The head of the bay is shallow, and when running in it is only necessary to keep in mid-channel. The entrance does not stand out with sufficient prominence to be distinguished from a great distance, but a near approach brings it out distinctly. In

making Bahia Honda, Coiba island and Afuera island will be first seen from whatever quarter the bay is made. About 2 miles from the harbor are two islands, Medidor and Pacora. These islands must be left to the northward when running for the bay. Within the bay and facing the entrance is Talon island. This island divides Bahia Honda into two parts, known as Chinche and Legamo bays.

**Water** can be procured in great abundance, especially from a stream named Cabre. There is a watering-place on the SE. side of the bay. A boat can anchor in calm weather and use a hose.

**Anchorage.**—The most convenient anchorage for large vessels is to the westward of Talon island in Chinche bay. The only dangers in this vicinity are a sunken rock of 8 feet, 300 yards in length, northward of Point Guarida, and a reef about the same distance northwestward from Pueril island.

**Coiba island** is covered with forests, and there is an abundance of good water in every part. Vessels can anchor off all parts of it in fine weather, but it does not possess any bay or harbor in which vessels may be protected from all winds.

**Supplies.**—Few vegetables or fruits can be obtained here, but crabs, cockles, and oysters are plenty. Alligators, sharks, and sea-snakes swarm on the adjacent shores. Turtle are in abundance, but they are hard to catch.

**The Hicarons** are southward of Coiba. The smallest is entirely covered with cocoa trees. The channel between these islands and Coiba is clear of sunken rocks, but as there are some dangers near the SE. point of Coiba, it will be better to pass to the southward of the Hicarons than to attempt this passage.

**Rancheria.**—Off the NE. point of Coiba island are several rocks and islands, of which the largest is Rancheria. There is a channel between Coiba and this island, but as there are several rocks in the passage, it is not prudent to attempt it.

**Contreras.**—This group, which is about 10 miles to the northward of Coiba, is composed of two principal islands, but has no good anchorage. Vessels can approach these islands without hesitation, as it is believed there are no sunken dangers which are not shown by breakers. About 2 miles south of the islands is Prosper rock, a pinnacle bearing the appearance of a black tower. It is not prudent to pass between it and the islands on account of a reef midway in the channel, which is partially dry at low tide.

**Secas.**—Among these islets and rocks are no sunken dangers which are not indicated by breakers. Good shelter for small vessels can be found, and upon some of the islets a landing can be made. No fresh water is to be obtained. About 3 miles eastward from the Secas is a dangerous rock called Bruja. The position of this reef makes it a formidable danger, especially at night.

**Montuosa.**—This island rises to a considerable height, and has a summit covered with cocoa and other trees. Landing was found behind some little creeks on a sandy beach.

**Ladrones.**—These islands are barren, of moderate height, and can be approached with safety. The only known dangers are some rocks about a mile north of them, and a reef about 4 miles in the same direction, upon which at low tide is only 6 feet of water. As this reef is only shown by breakers when there is a stiff breeze, it must be carefully guarded against.

**Montijo bay** is of little value to shipping. The soundings being very irregular and in the greater part only 10 to 12 feet, it is seldom visited. Near its head is Leones island, having on each side a river accessible only to boats.

**Cebaco island** is irregular in shape. Some detached rocks lie off its western end, and when entering the bay by the east channel it is necessary to keep nearer the mainland than the island on account of a sunken rock that lies about a mile off its eastern point.

**Gobernador island** divides the western entrance of Montijo bay into two channels, either of which can be taken, though the northernmost is the better, being wider and less exposed to the strong outward current from the bay. When the bay is fairly entered, vessels of light draft can anchor on its west side and find good shelter from almost all winds. From Montijo bay to Naranjas islands the land is low. From Maraito point, except a reef above water 4 miles to the westward of Morro Puercos, the coast is clear, while 3 miles eastward is another reef with only 3 fathoms on it. From here to cape Mala is a bay, into which flows the Tomasi and Juera rivers. Fresh water can be obtained from the Juera. To the eastward of this bay are the Frailes, which are two barren islets. They are clear of hidden dangers, with the exception of a reef extending about 200 yards from the NW. point of the southern islet.

**Cape Mala to Liso point.**—The beach is sandy with no outlying dangers.

**Cape Mala** is a low but cliffy point, with outlying ledges of rock having deep water close to them. On opening the gulf of Panama around this point a strong southerly set is generally experienced, especially in the dry season.

**Iguana island**, north of cape Mala and a little higher than the adjacent coast, forms a conspicuous object. At this island the flood tide sets northward and the ebb SE., the latter being considerably, the stronger, especially between December and June.

**Parita bay** is exposed to all winds blowing from the eastward. From here to Chame point the coast consists of a beach backed by a low wooded bank, and is called Playa Grande.

**The Pearl islands**, also known by the name of Islas del Rey, Peter Perlas islands, islands del Istmo, and Islas del Colombia, form an archipelago on the eastern side of Panama bay, covering an area of about

450 square miles and consisting of 16 islands and several small rocks The islands are low and wooded; the soil fertile but not much cultivated, and the numerous cocoa-nut groves and bright sandy beaches, intersected by small rocky bluffs crowned with trees, give them a pleasant appearance. Most of them belong to merchants at Panama, who employ negroes to plant and cultivate them.

Rey island is the largest; San José, Gonzales, Casaya, Saboga, and Pacheca are of secondary and the rest of minor importance. There are from 30 to 40 fishing villages among these islands, containing over 2,000 inhabitants, who are chiefly engaged in the pearl fishery.

The pearl shells gathered near these islands are what are known as Panama or bullock shells, and are found in water about 40 feet deep; they are gathered at the rate of about 3 tons of shells per day, and shipped to San Francisco or Panama in barrels. About one shell in a thousand contains a pearl.

**Saboga anchorage.**—Pacheca, Saboga, and Contradora islands form the northern part of the archipelago, and between them is a good and spacious harbor well suited as a depot for steam vessels. Contradora has 5 fathoms close to its northward shore, and is low and well adapted for wharves.

This harbor has three entrances, each possessing a 5-fathom channel, which may be used as best suited to wind and tide. All these channels should, however, be used with caution, as the soundings are changing and several shoal patches are reported, especially in the Saboga channel. On the eastern side of Saboga there is a considerable village.

**Chapera and Pajaros.**—There is a 4-fathom channel between them, but it should not be used, as the ground is foul. No vessel should attempt the passage between these islands and Rey island.

**Rey island**, the largest island of the group, has several peaks, the highest being about 600 feet. Numerous islets, having deep water between them, lie 3 miles off its western shore, but they should not be approached by strangers within the depth of 10 fathoms. Cocos point, its southern extreme, is a remarkable promontory jutting out into the sea; its extreme cliff is crowned by an umbrella tree, which makes it conspicuous.

There are also islands off the eastern shore of Rey island, but they are steep-to and can be approached to within one-half a mile, with the exception of Canes, where there is a 3-fathom patch lying outside a sunken rock nearly 1½ miles from shore.

**St. Elmo bay**, on the east side of Cocos point, is a fine bay, with convenient anchorage in from 6 to 9 fathoms, and a good stream of water at Lemon point.

**San Miguel**, the principal town of this group, is on the north side of Rey island, but is badly situated, as the landing is difficult at low water. All supplies are sent to Panama, and they are, therefore, uncertain and dear. Vessels having to lie off the town, should run in be

tween Caracoles and Cangrejo, using caution, as the bottom is irregular and rocks abundant, and anchor in about 6 or 7 fathoms when a conspicuous church is shut in or behind the islet of Afuera, lying off the town.

**Galera island** is said to be the first land made by vessels bound to Panama, as the channel between it and Cocos point clears vessels of San José bank. The island is small, has a cliff on its southern side sloping down to the beach, and, like Cocos point, has a remarkable umbrella tree.

**Pedro Gonzales island** is separated from the rocky islets off the west side of Rey island by a broad, deep channel, and has on its northern side two bays, protected from the north by the islands of Señora and Señorita. The bays named Perry and Magicienne were examined as to their capabilities for a depot for steam vessels, and although not so good nor so near Panama as the harbor south of Pacheca island, yet they still have some advantages. Trapiche island, which is connected with the shore of Gonzales island at low water springs by a sandy neck, divides the two bays. A large stream of water was found, in the month of April, at the end of what had been considered a remarkably dry season, on the western side of Magicienne bay. The bay, however, is small and shoal, lacking the advantage of Perry bay, which runs back a mile. Senora and Senorita, including the shoal off their eastern side, lie nearly a mile to the northward of Trapiche island with a 7-fathom channel between them and steep-to on both sides. The tidal stream is not felt in the anchorage, but there is a considerable set off the island, the flood running to the northward, the ebb to the southward, the latter being generally the stronger.

**San José island.**—The summit is a table-land, said to be a considerable grazing ground. Nearly 2 miles southeastward from Iguana point, the northern extreme, is a large water-fall emptying into the sea, and an excellent anchoring place.

On the southeast side of the island is a deep bay, but as the swell sets in there with great violence it is not convenient for shipping.

**Toboga**, with the islands of Urava and Taboquilla, forms a pleasant group, lying 9 miles to the southward of Panama. Toboga, the highest and largest, is well cultivated, with a large village on its NE. side. To the northward of the village is the Morro of Toboga, a small hill connected with the mainland by a sandy neck covered at high water. This is the headquarters of the Pacific Steam Navigation Company, which has here stores, coal, water, a gridiron 300 feet long, and a small machine shop for repairs. The anchorage off the village, being about 600 yards from the shore in 10 fathoms, is convenient.

**Urava** is a small lofty island, separated from the SE. point of Toboga by a narrow, shallow channel; off its extreme is the small islet of Terapa.

Taboquilla, also well cultivated, with some islets off its southwest extreme, forms the northeast island of the group; there is a wide and deep channel between it and Urava, in the center of which is a rock said to uncover 4 feet at low springs; but being steep-to, the sea seldom breaks over it at high water, and must be carefully avoided by closing either island. Vessels can pass south of it by keeping the neck of the morro open, bearing N. 55° W. Farallon, a small islet, also lies in this channel, but it is steep-to, with 11 fathoms between it and Taboquilla.

**Directions.**—Panama road, although shoal, may be considered secure, and with good ground tackle and common precaution a vessel might lie there all the year round with only one anchor down. The bottom being muddy, holds well. Attention to the tides and soundings will enable a vessel to lie close in at times for discharging cargo. On one occasion the U. S. S. St. Mary's, drawing about 17 feet, remained at anchor during the neap tide inside the Knocker buoy.

The inner anchorage is in 2 fathoms, about a mile off shore. The outer anchorage is in 3½ to 4 fathoms, about 2 miles off shore. Vessels drawing over 18 feet can round the southeast part of the Danaide rocks safely by keeping San José rock open of the west point of Toboga island, bearing S. 32° W. until the cathedral towers are open to the eastward of mount Ancon. Having passed the Danaide rocks, the ship will be fairly in the road and can anchor according to her draught. Vessels drawing over 34 feet can anchor to the north of Perico. (See Perico island.)

**Panama road.**—The shore between Petillo point, a black rocky promontory with a rocky ledge, and Panama forms a bay termed "El Puerto," nearly three-quarters of a mile deep; it is here that most of the minor trade of the gulf is carried on by means of large canoes made from trees. These canoes, though of clumsy appearance, carry frequently 12 tons, and are well fitted for the navigation of the gulf, and bring most of the tropical productions of the isthmus of Panama.

**Buey point**, only seen at half tide, forms the southern horn of this bay, and the northeastern point of the long rocky ledges that surround the eastern and southern shores of the peninsula of the city. These ledges extend 900 yards from the northeast bastion, 1,000 yards from the southeast bastion in an easterly direction, and 500 yards in a southerly direction, forming a bay to the southward of Buey point, which affords an easy landing on the sandy beach after half flood. From the commencement of the suburbs on the southern side another ledge runs off for nearly three-quarters of a mile, east of which are "Los Hermanos," three black rocks, visible at first quarter ebb, while detached rocks with 3 and 7 feet of water between them, visible only at low water springs, lie off the southeast extreme of the rocks, the outer one being 600 yards from the reef.

**Guinea point and adjacent islands.**—Guinea point is the northern extremity of a large, round, hilly projection which forms the western side of Panama road. Between this and the city of Panama are the mouths of the Rio Grande, Arena, and Falfan, all small rivers with cultivated banks. The water on this side of the road is very shoal as far as Tortola and Tortolita. Changarmi island, surrounded by the Pulpena reefs and the small islets of Cocovi and Cocoviceta, are dangers mostly above water. This part of Panama bay should be avoided.

**Perico and Flamenco,** with the outlying rock of San José, are a group of islands forming the south side of Panama road. Slepao and Calebra, the western and southern parts of Perico, are connected with Perico by a neck of beach and rocks, but at high water these three present the appearance of islands.

The passage between Perico and Flamenco is shoal and should not be used, while that between Flamenco and San José is deep and safe, as both islands are steep to.

**Perico** is the headquarters of the Pacific Mail Steamship Company, and the bay on its northern side forms a convenient anchorage. The isthmus on this side is sandy, and steam vessels of 2,500 tons and upwards can be beached easily for cleaning. Large vessels drawing over 20 feet can coal at Perico, and vessels using the anchorage should, after passing Flamenco, keep close round the north end of Perico and anchor when the isthmus opens. This anchorage was used by the U. S. S. Lackawanna in December, 1884, and January, 1885, the bearings being as follows: San José rock S. 2° 15′ E.; north end of Perico island N. 75° 22′ W., and north end of Flamenco island S. 50° W. They report the anchorage a very good one, as they were able to keep their air ports open and there was very little sea. The weather was remarkably cool and pleasant with very few warm days. The wind was generally from NE. to NW. with occasional calms about noon. The U. S. flagship Hartford used nearly the same anchorage; but in October and November, 1885, they experienced warm days, moderately cool nights, and frequent rains, light SE. breezes during the day and NW. breezes during the night. Attention must be paid to the state of the tide. As before mentioned, fresh water, coal, and supplies can be obtained here.

**Danaide rocks.**—These patches of conical rocks have only from 15 to 18 feet on them and 3½ and 4 fathoms on all sides, and lie in the track of vessels standing in for the anchorage. This spot is a favorite fishing place, and vessels should avoid canoes seen in its vicinity, as they are probably fishing on the rocks.

**Sulphur rocks.**—This dangerous reef, 1,200 yards long by 600 yards broad, has a rock awash in its center with 6 and 9 feet around it, and outlying patches of 12 and 14 feet. The railroad flagstaff on, with the centre of Ancon bearing N. 89° W., leads to the northward of the reef in 15 feet, but this passage should not be used at low water springs,

while the Hermanos rocks, in line with a round peak over the Rio Grande, lead to the anchorage in 18 feet.

**Knocker and Toboga rocks** have only 6 feet of water on them. The Knocker, which is marked by a *red buoy*, lies nearly 1 mile S. 89° E. from the SE. bastion; the Toboga rock lies a little more than 400 yards to the southwest of the Knocker buoy, with 16 feet of water between them and 12 feet inshore of them. *No stranger should attempt to pass west of the buoy.*

**Panama**, situated at the head of the bay, and the capital of the State, stands on a rocky peninsula jutting out into the shallow water of the bay, and was formerly a strongly fortified city. It has a fine appearance from the sea; the churches, towers, and houses showing above the ruins of the fortifications, stand out from the dark hills inland, and rendered still more conspicuous by mount Ancon, a fine hill nearly a mile to the westward. The expectations formed of Panama, as seen from the sea, are not realized on landing. Of the old Spanish houses constructed in the Moorish style but few remain. Three-story buildings, in which the two upper stories project, are sufficiently common to give a distinctive character to the city, which thus differs from most cities in Central America. Ruins of churches and convents occupy a large area. The cathedral on the west side of the plaza was built in 1760 in the so-called Jesuit style, and its two towers are the loftiest in Central America.

The President's residence, the governor's office, the State assembly-house, the new Central hospital, the Grand hotel (now the headquarters of the Panama Canal Company), are some of the principal buildings.

The fortifications were formerly well constructed but are now in ruins; the northeast bastion fell in 1845, while the southwest ramparts are in a fair condition and afford a pleasant promenade during the late afternoon hours and evening.

The principal streets extend across the peninsula from sea to sea, intersected by the Calle Real, or Royal street, which runs from east to west.

Water-works, bringing the water of the Rio Grande into the city, were under construction in 1885. The city is lighted by gas; rents are high and living expensive.

**Health and hospitals.**—The highest and lowest temperatures at the canal company's observatory on Navos island were 102° and 66° Fahr. The most sickly parts of the year are at the changes of the wet and dry seasons. It is also considered that the prevailing direction of the wind has some influence upon the sanitary state—that the northwest winds are healthful and the southeast winds have a contrary effect. During the wet seasons the air is loaded with moisture, calms and light variable winds prevail, and the weather is very oppressive. The sanitary condition is bad. The streets are very dirty, and only in the localities occupied by the better class of people is any attempt at clean-

liness made. In the rainy season the streets are kept comparatively clean by the heavy rains. The habits of the people in general are filthy. Yellow, intermittent, bilious, and pernicious fevers are epidemic, and yellow fever was so considered in July, 1885. No reliable information can be obtained as to the mortality of the port. It has been reported as high as forty per diem during the sickly season.

The Central hospital, built and owned by the canal company, is on high ground, at the foot of Mount Ancon, is well managed, and its cleanliness is considered perfect. It is conducted by sisters of charity and a corps of European surgeons, and has a capacity of 500 beds. Cost of occupation $2 and $5 per day for a separate room. A sanitarium on Toboga island in Panama bay is connected with the hospital.

The Saint Thomas hospital in the city is subsidized by the Colombian government. It is conducted by sisters of charity, but is not well kept, and is very dirty. Capacity small. Cost of occupation $1 per day.

*There is no established quarantine.*

**Population** in 1885 was 25,000, of which fully 5,000 were a floating population of strangers.

**Consuls.**—The United States, Great Britain, Germany, and France have consul-generals resident at Panama, and many countries are represented by consuls.

**Supplies and water.**—Provisions and supplies can be had at Panama, but it is considered unsafe to buy them, owing to the bad sanitary condition of the place and the consequent danger of infection. The supply is ample, but the cost is high. Lighters for the transportation of stores can be hired from the railway company. Fresh provisions can be purchased as required. Fresh beef 12 cents, gold; vegetables, 10 cents; bread, 10 cents. All kinds of fruits and vegetables peculiar to the tropics can be obtained the entire year. The Pacific Mail Steamship Company have stores on Flamenco island and the canal company in Panama. Ice can be obtained in large quantities. Sand is obtained from Perico island. Good water can be obtained from the Pacific Mail Company at Flamenco island, or from the Pacific Steam Navigation Company at Toboga island. From this place it is brought alongside and pumped into the tanks by steam pumps. The cost at last accounts was 2 cents per gallon.

**Coaling facilities.**—The Panama Canal Company, Pacific Mail Steamship Company, and the Pacific Steam Navigation Company keep constantly on hand large quantities of coal: of the different kinds, Cumberland, Cardiff, Welsh, Newcastle, and Australian coal can be obtained, though it is said the steamship companies will not part with any when it can be otherwise obtained. The coal is delivered alongside in lighters, holding from 150 to 250 tons. Coal belonging to the canal company is stored at La Boca, the new settlement at the mouth of the Rio Grande, and they always have a large supply on hand. The cost per ton is from $13 to $15, American gold.

Coal may be obtained directly from the ship or collier, which lessens the danger of fever. The Pacific Steam Navigation Company has a contract with the English government to keep a supply on hand for use of Her Majesty's ships.

**Telegraph and postal communication.**—Panama is connected with South American and Central American ports by the Mexico, Central and South American cable; there is a land line to Colon, and thence by cable to Jamaica and the West Indies. The line to the United States also goes via city of Mexico and Galveston, Tex. Postal communication to the United States and Europe is by steamers from Colon; to San Francisco, Central America, Mexican ports, by the Pacific Mail steamers; and to South American ports, steamers of Pacific Steam Navigation Company. Mails from the United States are irregular at times.

**Steamer lines.**—There are four lines of steamers which make Panama their terminal port, viz:

1st. The line from Panama to San Francisco, twice a month, calling at Central American and Mexican ports.

2d. The line from Panama to Acapulco, Mexico, once a month, calling at way ports.

3d. The line from Panama to Champerico, once a month, calling at way ports.

These lines are owned and managed by the Pacific Mail Steamship Company of New York.

4th. The line from Panama to Guayaquil, once a month, and on her return from Panama to Tumaco.

The last two lines are owned and managed by the Pacific Steam Navigation Company of Liverpool, England.

**Duties and port dues.**—The commerce of Panama naturally divides itself into two branches, viz, that which is local and that which is in transit. The transit trade is also divided into two parts—that to and from the United States and that to and from Europe.

The local exports are india-rubber (growing scarcer), gold dust, hides, ivory-nuts, manganese, shells, tobacco, cocobolo (a cabinet wood), tortoise shells, vanilla, whale oil, sarsaparilla, cocoanuts, and fruit.

From South America the bulk of the shipments consists of bark, cotton, cocoa, and rubber; from the Central American states, coffee, sugar, and indigo.

Panama is a free port; no import or export duties are imposed.

There is no captain of the port, and no port regulations. Pilots, health officers, and lookouts do not observe the laws, for the reason there is no health officer. No pilots are required, and no place designated for depositing refuse matter or ashes. Police force is inefficient. The only police force in town is a company of the military force of the government.

**Docks and machine shop.**—There are no docks at Panama nor any government docks near by. The Pacific Mail Steamship Company have

a small machine-shop on Navos island for repairing vessels of their line, and the Pacific Steam Navigation Company have one at Tobaga islands for the same purpose. The gridiron at Toboga is the only means of repairing vessels' hulls.

**Landing place** at high water is round Buey point, inside the NE. bastion, at the market-place known as "the steps." At low water the reef abreast the town was used. The canal company have placed a number of buoys and beacons on the outlying reefs, which will mark the channel for boats going into the landing. The foot of the sliding ways of the canal company has been used, but is inconvenient and not recommended.

**Official calls and salutes** the only native authorities to be called upon are the president of the state of Panama and the President of the republic, who is seldom in Panama. There are no saluting facilities.

**Panama ship canal** to connect the Atlantic and Pacific oceans, is under construction between Aspinwall (Colon) and Panama. On the Pacific slope it will descend the valley of the Rio Grande and be continued seaward to the island of Perico. Total length is 54 miles. The depth is to be 8½ meters (nearly 28 feet) below the mean level of the oceans, and the width 22 meters at the bottom and 50 meters at the top.

**Panama railway** from Panama, on the Pacific, to Colon or Aspinwall, on the Atlantic, is 47 miles long. Fare is $25 in American gold; luggage allowed, 100 pounds. It is now owned by the canal company.

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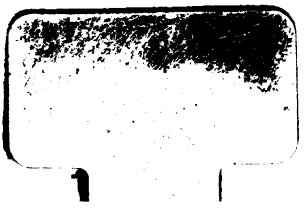
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